Virginia Medical Monthly

Official Publication of the Medical Society of Virginia

Vol. 67. No. 8
WHOLE No. 1058.

RICHMOND, VA., AUGUST, 1940

$2.00 A YEAR
25 CENTS A COPY

THE INCIDENCE OF PULMONARY TUBERCULOSIS IN SOUTHWESTERN STATE HOSPITAL.

A Preliminary Report.*

J. R. Blalock, M.D.,
J. B. Funkhouser, M.D.,
and
J. E. K. Flannagan, M.D.,
Marion, Virginia.

Introduction

This report deals with an X-ray survey of a complete mental hospital population with reference to pulmonary tuberculosis. This activity grew out of conferences with Dr. H. C. Henry, Director of Virginia State Hospitals, and Dr. E. C. Harper, Head of the Tuberculosis Division, Department of Health, concerning the tuberculosis problem at the Southwestern State Hospital.

At this hospital we were completing an eighty-bed building for tuberculosis, based on a liberal estimate that 6 per cent of the population might have tuberculosis. Actually there were about ten known cases in the hospital; this in the face of a known incidence of active disease in mental hospitals of 3 to 4 per cent.

It was very apparent, therefore, that a careful investigation of our population was indicated and this study is herein reported.

X-ray examination was the method chosen as the most practicable single means of detection of pulmonary involvement. A careful chest examination of nearly 1,300 patients with our small staff was impracticable. Such diagnostic methods as tuberculin skin sensitivity tests, sputum smears, blood sedimentation rates, guinea pig inoculation and cultures were dismissed except for later supplementary and classification studies. Negative tests such as these have no positive diagnostic significance and carry only a negative value. Fluoroscopy is subject to criticism in that sufficient detail of lung structure is lacking for accurate diagnosis. It is almost unanimously agreed that taking X-ray films of the chest constitutes the only efficient, conclusive and entirely satisfactory method of detecting tuberculosis in a large number of mentally ill patients in a short period of time.

*Read before the Virginia Neuropsychiatric Society in Richmond, Va., February 7, 1940.

Description of Survey

On recommendation of Dr. E. C. Harper, of the Virginia State Health Department, the services of a firm were engaged and paper films were taken of our ambulant patients. By this rapid technique 1,095 of our 1,263 patients were X-rayed in two days (March 24 and 25, 1939). The remainder were X-rayed and poor or debatable films were retaken, using celluloid films, during subsequent weeks by our own staff.

It seems desirable here to give a description of paper films. To obviate the necessity of changing cassettes there has been developed a light sensitive emulsion which may be used in X-ray work that can be fixed to paper rolls. These rolls, each of which accommodates a hundred exposures, are placed in a special frame and a simple turn of the roll brings up the next section for exposure, using the same principle as a roll-film camera. In this way exposures can be made almost as quickly as subjects can step in line. Later, during development, the emulsion is dissolved from the paper, leaving a print rather than a negative. The reading of the roll, of course, necessitates a special view box with direct lighting since the films are not transparent.

No claim has been made that these paper films are as satisfactory for diagnosis as celluloid films. The rapidity with which they can be taken and read is their chief claim to distinction. However, they show sufficient detail for survey work of this nature. Whenever the paper films were even slightly questionable, the patient was re-X-rayed on celluloid. The result of such checking of paper against celluloid has not as yet brought out any evidence against the diagnostic value of paper films, but has enabled us to definitely classify some questionable cases.

It has been estimated that it would have taken approximately three months, working seven days a week, to have taken all the films on celluloid that were taken in two days on paper. This would have left the X-ray department no time for routine work and would have tied up the attendants and other personnel for the same period of time. Although the expense of paper films is about equal to that of celluloid, this saving of time and labor must be accounted to the credit of the paper film.

The census of the hospital has, of course, changed since the work began. Only those patients who were in the hospital on March 25, 1939, however, are accounted for in the figures to be reported. The percentages, therefore, represent the status as regards tuberculosis on March 25, 1939, slight changes having since occurred.

FINDINGS OF SURVEY

The results of the roentgen survey are summarized in Table 1.

TABLE I.
SURVEY DATA.

	MEN	WOMEN	TOTAL
Number of chest films (Entire hospital population)	701	562	1,263
Entirely negative	437	226	663
Non-tuberculous lesions, abnormalities and healed tuberculosis	195	250	445
Suspicious tuberculosis	15	9	24
Positive tuberculosis, all stages	54	77	131
A. Active	29	24	53
1. Minimal	9	11	20
2. Moderately advanced	13	10	23
3. Far advanced	7	3	10
B. Inactive	25	53	78
1. Minimal	22	45	67
2. Moderately advanced	2	7	9
3. Far advanced	1	1	2
PER CENT			
Active tuberculosis	4.14	4.27	4.19
Inactive tuberculosis	3.71	9.43	6.18
All tuberculosis	7.70	13.70	10.04
Suspicious	2.13	1.60	1.90

Altogether, 10.04 per cent (131 cases) of our patients had X-ray evidence of pulmonary tuberculosis in one form or another. On the basis of activity, 4.19 per cent (fifty-three cases) had active lesions and 6.18 per cent (seventy-eight cases) had inactive lesions.

These figures do not include those patients with primary lesions because the dictated X-ray readings did not in all instances note the calcium indicative of childhood or primary tuberculosis.

It is well here to reiterate that the differentiation into active and inactive tuberculosis is solely on the basis of the X-ray appearance of the lung. Clinically, many of these active cases are physically robust and have negative sputum reports, while, on the other hand, one of our cases, first pronounced arrested, has shown tubercle bacilli in the sputum.

The hospital residence of our patients with tuberculosis varied from a few weeks to forty-one years. All of the counties of southwest Virginia are represented. There appeared to be no relation of the disease to mental diagnosis other than deterioration. By far the majority of our patients with active tuberculosis were found among the chronic deteriorated group, such as those having long standing dementia praecox or epilepsy. The incidence by wards paralleled this finding inasmuch as the wards where the highest incidence of tuberculosis was discovered were those where deteriorated patients were kept.

A difference in sex incidence was noted in that there were more women with inactive tuberculosis than men. Of the men 3.71 per cent had inactive tuberculosis while 9.43 per cent of the women had inactive tuberculosis, a ratio of nearly three to one.

Of the women 13.7 per cent had tuberculosis in one form or another; only 7.7 per cent of the men, a ratio of nearly two to one. In other words, although twice as many women had tuberculosis as men a far greater number of women had it in an inactive stage.

Active cases in relation to total population were nearly equal in the two sexes; 4.14 per cent among men and 4.27 per cent among women.

A comparison of our figures with those of the survey of the Ontario Mental Hospital, as reported by Dr. Clarence A. Wicks recently, is striking. In his survey of 13,000 patients, it was revealed that 10 per cent had tuberculosis while 3 per cent had active tuberculosis. In our figures 10.04 per cent

had tuberculosis; 4.19 per cent had active tuberculosis.

In addition to the patients, the attendants, nurses and other employees have been made the subject of study. Among the attendants, 4.64 per cent were found to have active tuberculosis. One of our nurses was found to have active tuberculosis, totally unexpected prior to the making of the X-ray film. Other employees have been found with either active or arrested pulmonary disease but the figures have not yet been completely tabulated in the case of the other branches of the hospital personnel.

Many incidental findings, such as cardiac changes, developmental anomalies of the thorax, foreign bodies, etc., were brought to light during the progress of the survey. This presentation, however, will be limited to the subject of tuberculosis, leaving the discussion of these other findings for a later report.

MANAGEMENT AND TREATMENT

At the present time (February, 1940) we are proud to announce that all of our active cases of tuberculosis are isolated in a separate building. Before the survey, active cases unsuspected by us were scattered throughout the hospital, working on the farm, in the dairy barn and even in the kitchen.

In regard to sputum examination, we find that many of our patients are un-cooperative and are, therefore, not suitable subjects for sputum studies. For example, a deteriorated patient, having the catatonic type of dementia praecox, may not produce sputum for examination but only saliva. Expectorating into a sputum cup or sputum bottle is an exception rather than the rule for this type of patient. To get sputum really suitable for examination, it is necessary to have intelligent cooperation; hence a majority of our undoubtedly active tuberculous cases still have entirely negative sputum (or rather saliva) reports after repeated examination.

Treatment is a matter of such vital interest that a brief mention of it will be made here. In addition to bed rest, additional nourishment, special nursing, and isolation technique, 28 per cent of our active cases have been treated by artificial pneumothorax (actual number, fifteen patients).

In regard to artificial collapse therapy, we expected considerable difficulty with un-cooperative patients, both during fluoroscopy and during each collapse. We have been surprised to find that, with few exceptions, our patients have presented no special contraindication to this form of therapy by reason of their being disturbed mentally. We feel that in the psychoses there is special indication for pneumothorax since lungs can by this means be put to rest in many cases where voluntary bed rest in the usual sanatorium sense cannot be carried out.

The preventive aspect should not stop with isolation and adequate treatment of those patients found to have tuberculosis at the time of the survey itself. Since the survey all new patients and all new employees have been given routine X-ray examinations.

The tuberculosis building itself is of fireproof construction, one story in height, with two exteriorly symmetrical wards, one for each sex, between which is located a central kitchen. A graduate nurse in charge has had experience in a tuberculosis hospital. One physician has had considerable previous experience with tuberculosis, both as regards diagnosis and management. Arrangements were made whereby, under Dr. J. B. Nichols, Superintendent of Catawba Sanatorium, another physician received an intensive course in collapse therapy.

ACKNOWLEDGMENTS

Special acknowledgment is made to Drs. E. C. Harper, C. W. Scott and C. L. Savage, of the Virginia Department of Health, Tuberculosis Division, for reading the paper films concerned in this survey. Thanks are also due to Dr. C. H. Peterson, of Roanoke, who was appointed consultant in Roentgenology shortly after the reading of the paper films, and to one of the authors (J.E.K.F.), for the interpretation of the celluloid films totalling several hundred.

SUMMARY AND CONCLUSIONS

1. An X-ray survey of all patients as of March 25, 1939, totalling 1,263, has been made at the Southwestern State Hospital with reference to pulmonary tuberculosis.

2. The survey showed that the incidence of pulmonary tuberculosis in some stage, other than healed primary, was 10.04 per cent, and that 4.19 per cent had active tuberculosis.

3. At present seventy-eight patients, over 6 per cent of our population, are isolated, receiving adequate medical, dietary and special care in a new eighty-bed tuberculosis building. Pneumothorax treatment has been instituted in 28 per cent of the active cases.

4. Since this survey all new patients and em-

XUM

ployees have been routinely X-rayed. The findings, from the interpretation of the films, as they accumulate, furnish data that will become increasingly valuable.

5. Tuberculosis in state hospitals is a larger problem than has been generally recognized. It is to be expected that about 4 per cent of the patients will have active pulmonary tuberculosis. Unless these patients are found, they cannot be segregated and treated and constitute a menace to the entire hospital population.

REFERENCES

Hamilton, Samuel W., and Kidner, T. B.: Buildings for the Tuberculous Insane. Bulletin, National Tuberculous Association. Technical Series No. 4, 1925.

Harrison, Daniel A., and Schein, Gabriel: Report on Tuberculosis Survey recently completed at Marcy State Hospital. *Psychiat. Quart.*, 11, 637, 642 (October), 1937.

Klopp, Henry L.: The Care of Tuberculosis Patients in Mental Hospitals. *Am. J. Psychiat.*, 96, 641, 654 (April), 1927.

Wicks, Clarence A.: Paper read at 1939 meeting of the American Psychiatric Association (unpublished).

DISCUSSION

DR. GEORGE B. ARNOLD, Colony: I want to congratulate the Southwestern State Hospital on the excellent piece of work that they have done. We have done something similar at the Colony. When we built a tuberculosis sanatorium at the Colony we had a thousand patients in the institution. Our tuberculosis sanatorium has sixty-four beds in it; since the sanatorium was opened all the beds in it have been filled.

In addition, we have a number of cases of tuberculosis in our idiot wards. These cases are not moved to the tuberculosis sanatorium because of the State law forbidding us to place idiots with other patients of higher mentality. Then, too, you can see how objectionable the presence of idiots would be to the patients of higher intelligence in the tuberculosis sanatorium.

When we opened our tuberculosis sanatorium we started to do pneumothoraces. We have discontinued this procedure, however, because we have found that it does not work well with our patients.

At the staff meeting yesterday one of our doctors who has had quite a bit of experience working with tuberculous patients elsewhere stated that he thought that the results that we were getting in our sanatorium were excellent; he thought that the patients, if anything, did better than tuberculous patients of normal intelligence in the regular tuberculosis sanatoriums.

We have been able to discharge a number of patients from our tuberculosis sanatorium and send them back to the wards in our regular dormitory buildings. We do not do this, of course, until we are certain that their sputum is negative and they are in good shape physically.

DR. L. X. KOLIPINSKI, Petersburg: We are doing work similar to this at the Central State Hospital We X-ray all the new patients, using the celluloid film, and the information collected in this way is being tabulated. As has been found in making these studies, the more cases roentgenographically examined, the more cases of tuberculosis are discovered. Our tuberculous patients are isolated, given bed rest and special care, and suitable ones given collapse therapy.

With the negro the incidence of tuberculosis is perhaps much higher and the response to treatment does not seem to be as favorable as the response of the white patients. But, nevertheless, many do respond to treatment. We can in some cases obtain sputum from even uncooperative patients by the persistent attempts of the nurses and attendants. We have not attempted the throat swab to collect sputum.

If the work is done in all the hospitals, I believe the results would be found to approximate those of the Southwestern State Hospital. Unfortunately, tuberculous pneumonia has a high incidence at the Central State Hospital and runs a rapid course, many cases resulting unfavorably.

I enjoyed the paper very much and I trust we will be able with the studies we are making to corroborate the findings at the Southwestern State Hospital.

DR. JAMES ASA SHIELD, Richmond: It is a most interesting and revealing paper.

I was wondering how many patients who have tuberculosis of the lung have metastasis of the brain (we know that lung diseases do metastasize to the brain), and how many of the patients who have tuberculosis of the lungs have a metastasis to the brain—tuberculoma, or even more acute things, such as tubercular meningitis or tubercular encephalitis, accounting for the psychotic picture and resulting in the commitment of the patient to the mental hospital.

DR. J. B. FUNKHOUSER, closing: Before trying to answer some of the very interesting questions that have come up, we should like to make a sort of apology by saying that this is merely a preliminary report, and that, although we intend to follow up many of the points discussed here, we are not able to answer some of the questions satisfactorily at this time.

Dr. J. Powell Williams raised the question of the incidence of pulmonary tuberculosis in the general population. We had hoped that Dr. Harper would be here to answer that question. We are unable to do so, but Dr. Blalock does have some figures on the incidence of tuberculosis in other types of institutions and other surveys, and I would like to ask him to give us those figures now if he will.

DR. JOSEPH R. BLALOCK: The most pertinent study of the incidence of pulmonary tuberculosis that I might mention is that of the Bureau of Tuberculosis, City Health Department, of New York City, reported in the February 21, 1940, issue of the *New York Herald Tribune*. A seven-year survey of about 225,000 chest X-ray photographs was made and analyzed in various groups.

In the general population the incidence was 2.5 per cent. The highest incidence was 5.3 per cent among the city's homeless men; 4.5 per cent among the city prisoners; the lowest among college students, 0.2 per cent. By race, the lowest incidence was among the Jews; the highest among the Negroes.

An industrial concern in Virginia made an X-ray survey of its employees, totalling nearly 1,000, and found about 2.5 per cent to have positive X-ray findings of pulmonary tuberculosis.

In 1927, Dr. Henry I. Klopp, of Allentown State Hospital, Pennsylvania, having sent out questionnaires, reported on 106 responses received from state hospitals in forty-four states with a total of 188,339 patients. Of these 3.1 per cent had known tuberculosis. Only fifty-five of the 106 hospitals reported that they took X-ray films of the chest.

I am particularly anxious to know what the incidence of tuberculosis will be at the Central State Hospital with its colored population.

DR. J. B. FUNKHOUSER: Dr. Kolpinski has brought up the problem of whether or not his incidence with negro patients will be higher than ours. We shall be anxious to see what his results are after a few months. I would like to say that we have had no case of tuberculous meningitis or tuberculous pneumonia. We have had only one death since we began this intensive study of tuberculosis, in which tuberculosis was the primary cause of death. Although this work has not been carried out for a long enough period of time, especially with the pneumothorax, to say how many are benefited, we have lost no patients, except this one and he died a few days after the picture was taken.

The question of Dr. Shield about tuberculosis metastasizing to the brain, we cannot answer. I would like to say, however, although we attempt to perform autopsies on all the cases we possibly can, we have not yet found any gross evidence of tuberculoma of the brain. Yet, on the other hand, we have had only two known cases of tuberculosis to come to autopsy.

Dr. Arnold's figures interest me, in that sixty-seven cases in 1,000 represent about 6.7 per cent. I would like to ask whether that represents active cases or all cases of tuberculosis. (Dr. Arnold states that at the present time he has about 1,500 patients and now has about sixty-five cases in the active ward.)

That figure is approximately the same as ours.

In conclusion, I would like to thank all those who have shown their interest by discussing this paper and by asking some very pertinent and provoking questions, and I apologize again for not being able to answer them better at the present time.

THE PRESENT STATUS OF SERODIAGNOSTIC TESTS FOR SYPHILIS FROM THE STANDPOINT OF THE CLINICIAN.*

DUDLEY C. SMITH, M.D.,
University of Virginia,
Charlottesville, Virginia.

A discussion of the serological tests for syphilis from the clinical standpoint must necessarily overlap and include consideration of some of the problems of the serologist. The serologist or laboratory director in close association with the clinician can keep the set-up of his tests in such a state of balance that their efficiency is increased. In this way he can also determine the value of modifications and suggested improvements in these tests. The clinician should not only be a constant consultant with the serologist but should cooperate by furnishing the laboratory suitable specimens. Majority opinion at the present time is in favor of the laboratory using on all specimens of blood an improved standard complement fixation and a reliable flocculation reaction. This duplication is somewhat more expensive but prevents many errors both of omission and commission.

*Read at the 1939 meeting of the American Academy of Dermatology and Syphilology in Philadelphia.

In America knowledge as to the reliability of various modifications of tests and the reliability of many laboratories is being made available by "The Committee on the Evaluation of Serodiagnostic Tests for Syphilis". No procedure or group of procedures has yet reached the goal of perfect sensitivity and specificity. The best methods in the best laboratories should have a sensitivity score of about 85 per cent and a specificity score of about 99 per cent.

Syphilis is the most prevalent serious infectious disease in this country. If it is to be controlled every clinician in all branches of medicine must cooperate in its diagnosis and management. The applications of the simple plan of finding the infected individuals and properly treating them is the basis for the prevention of new infections and the progression of already acquired infection. The physician must depend on his knowledge of the clinical manifestations of the disease, and the routine use of

serological tests in all patients to detect the infected individuals. Neither alone nor in combination are these methods entirely dependable. From the clinical angle much of the disease is hidden below the threshold of recognition and the serological tests are not completely trustworthy. *Judicious use of these means by capable clinicians and accurate serologists along with tactful epidemiologists will eventually eradicate this malady.*

Clinical means unaided cannot detect all syphilitic infections, the extensiveness or meagerness of the injurious process or the location of the predominating damage in many patients. Numerous laboratory measures for helping to solve these problems are available and serological tests on blood and body fluids have a prominent ranking in these services. It is desirable that we know and understand the advantages and weaknesses of these tests in the field of modern syphilology.

Serological tests for syphilis have now been in existence for one-third of a century. They have been subjected to all types of scientific and unscientific criticism and commendation. It is worthwhile to attempt a discussion, even if incomplete, of their true value. The complement fixation and the flocculation reactions on serum for diagnosis of syphilis have been greatly improved during the last several years. These two types of tests have about kept pace in their race for more complete accuracy. Their percentage of error is probably lower than that of any other important laboratory aid in medicine. The controversy as to whether or not these tests are based on a reaction of a syphilitic immune body with an antigen identical with a true antigen of the micro-organism is not vital from the practical side. Much direct scientific and circumstantial evidence seems to prove the specificity of these reactions for syphilitic infection when certain items of error are eliminated.

When one considers the many complicated achievements of scientists in the basic field, such as the determinations of the structure of the atom and behavior of its parts, the physiochemical phases of photography and sound transmission, separation of the different molecules in a mixture with the ultracentrifuge, production by synthesis of intricate substances like endocrine secretions and vitamins; modifying significantly and accurate substances—like colloidal suspensions—by minute alterations in environment, etc., it is not difficult to accept as true that makers of an antigen for the diagnosis of a disease hit upon a lucky but true discovery. The theory that the minute globules in the colloidal antigenic suspension are partially or completely coated over by some substance in the serum of the syphilitic individual, allowing these to fix complement or produce flocculation, has theoretical substantiation and much corroboration from clinical experience. *It is not necessary to accept the criticism without challenge that these tests for syphilis are just blind stabs in the dark.* It can be admitted, without disrupting the main theory, that there are substances produced in other conditions which may have similar or partial action like those in syphilitic serum, or that this substance is always produced abundantly in all syphilitics. This admission makes it imperative to know what these other conditions are, so that they can be excluded and prevent erroneous conclusions.

Technical laboratory errors resulting from human frailty such as mislabeled tubes, misplacing ingredients and incorrect reporting are possible occurrences. These errors are corrected by repetition of the tests in the same or other laboratories, or both.

A discussion of the limitations of these tests should include a review of the explanations for false-negative and false-positive reports. It is impossible to explain all instances of these incorrect results but a number of them are due to known factors.

LIMITATION OF TESTS

I. False-negative—
   1. Small amount of "reagin" due to
      (a) Short period or low level of immunity stimulation—primary, latent or tertiary.
      (b) Lack of resistance response—malignant syphilis, newborn, associated diseases.
      (c) Neutralization by alcohol, ether, antisyphilitic and other drugs.
   2. Improperly prepared and titrated reagents.
   3. Biological difference in reaction—immunity response other than indicated by "reagin".
   4. Native hemolysins for indicator red blood cells in serum.

Fig. 1.

Negative serological reactions in syphilitic individuals may result. Some reasons for this are outlined in Chart I. Small amounts of "reagin" in the serum occurs in the early days of the primary stage and less often in latent or tertiary syphilis. This is due to the immunity stimulation being for a short period or at a low level. This occurrence is very infrequent in secondary syphilis.

Negative tests are found in individuals who fail to show resistance to the infection. This is illustrated in malignant syphilis, malnutrition, the first few weeks of life and when the individual is suffering from other debilitating diseases.

The "reagin" may be neutralized or its formation prevented by alcohol, ether, antisyphilitic and other chemicals. The ingestion of alcohol undoubtedly is an important factor in lowering the sensitivity rate of the serodiagnostic tests in syphilitic patients. This is, of course, very difficult to eliminate in routine practice but can be corrected when repeating tests in individuals who have doubtful reactions, suggestive clinical findings or for treatment control. This neutralization effect is more significant, of course, in the case in which there is only a small amount of "reagin" already present.

Tests performed with antigens of low sensitivity result in a high proportion of false-negative results. A perfect antigen would be one which could be used in high concentration without increasing the tendency to give false-positive results. In our present state of knowledge, however, it has not been possible to make an antigen which would not have a tendency to give false-positives when used in strong concentration. It is true that this property of antigens has been greatly improved during the last few years; in other words, the best antigens used now can be used in a moderate excess without producing false-positives. It is hoped that shortly the factor in the antigen which causes this tendency will be completely eliminated. The other reagents used in the tests must also be properly prepared, standardized and mixed. It is particularly important in the flocculation test that the antigenic extract be used in proper amounts and that the optimum strength and amounts of saline solution be added to this in the correct manner. The necessity for these minute details is a handicap for the flocculation reactions.

There may be an atypical or variant qualitative type of immunological response in syphilis. Several types of biological resistance in syphilis are theoretically possible and probably occur in all cases. The major response to the Spirochaeta pallida in some cases may be by immunity mechanisms other than that indicated by "reagin".

When an heterologous hemolytic system is used in complement fixation tests, a false-negative reading may result from native hemolysins in the serum for the red blood cells used as indicator. This occurs very rarely.

LIMITATION OF TESTS

II. False-positive
1. Other diseases—leprosy, yaws, malaria, trypanosomiasis, pinta, and bejel frequently. Septicemia, endocarditis, pneumonia, tuberculosis, relapsing fever, spotted fever, typhus fever, scarlet fever, infectious mononucleosis, pernicious anemia, leukemia, xanthomatosis, severe jaundice and lymphogranuloma inguinale less frequently. Others very infrequently.
2. Bacterial growth in serum.
3. Excess fat and digestive products in serum.
4. Passive transfer from mother.
5. High barometric pressure increases tendency.
6. Improperly prepared, titrated and mixed reagents.
7. Probably some "cured" cases of syphilis.

Fig. 2.

Other diseases—leprosy, yaws, malaria, trypanosomiasis and bejel frequently give positive tests. These conditions are rarely encountered in the United States except malaria. They are easily excluded by clinical manifestations and other laboratory tests. The false-positive reaction caused by malaria disappears promptly following treatment for this Protozoan affection. It is known that bacterial growth in serum creates substances that cause positive or partially positive reactions in both antigen and control tubes; and also some species cause positive reactions only in the antigen tube, this giving rise to non-specific positive tests. This is probably more true of the complement fixation than with the flocculation reactions. Some of these bodies are removed from the serum by inactivation but others are not. Apparently all of them are removed by filtration without changing the "reagin" of syphilis. This bacterial growth may have occurred in the tube of serum or in the blood stream of the patient. This explains why patients with transient or more prolonged septicemia may give false-positive reactions. Staphylococcic septicemia, tuberculosis and pneumonia are frequently encountered conditions to be considered in this group.

Blood abnormalities like infectious mononucleosis, xanthomatosis, leukemia and severe jaundice may cause non-specific positive or partially positive reactions. The percentage of positive tests obtained in the late stages of lymphogranuloma inguinale is more than would be expected to result from associated syphilitic infection.

XUM

Other conditions have been reported as infrequently causing non-specific positive tests for syphilis. It is probable that a large percentage of these are examples of latent or asymptomatic syphilis associated with the other condition.

All samples should be examined while fresh, uncontaminated, with little or no hemolysis, and free from excess fats and from other substances absorbed from the intestinal tract. It is best to obtain specimens from patients before meal-time, preferably before breakfast. This is especially advisable in repeating tests following unsatisfactory or doubtful reports.

It is an established fact that "reagin" in the mother's circulation can be transferred to the blood of the fetus without the fetus being involved by the Spirochaeta pallida. In the cases illustrating the passive transfer of the "reagin", the reaction decreases in positivity and is usually negative about the third or fourth week of life. This fact, along with the one that the newborn with syphilis does not have sufficient concentration of "reagin" in the serum to give a positive test during the first weeks of life, makes serodiagnostic tests for syphilis of little value in the newborn.

Properly prepared and standardized reagents and their exact handling under suitable laboratory environment are responsibilities of the serologist. The correct interpretation of persistent positive serological reactions for syphilis in cases who have had a good background of treatment, negative spinal fluid findings, normal heart and aorta, and asymptomatic otherwise, is not yet a solved problem. There is still debate as to whether or not the presence of "reagin" in a patient indicates active infection with the Spirochaeta pallida. There is available some investigative evidence that immune bodies may continue to be present in the body of an animal which has been cured of a syphilitic infection. Nevertheless, the persistance of "reagin" in the chronic syphilitic after a prolonged period of modern therapy in a completely asymptomatic individual seems to indicate that there is sufficient resistance or immunity present to protect the individual against progression or relapse of his infection. Some authorities discontinue all treatment in this group of individuals; others advise short courses of treatment at infrequent intervals. Everyone advises these patients to remain under observation.

"The Committee on Evaluation of Serodiagnostic Tests for Syphilis" report that during 1938 and 1939 only two serologists performing the control tests on presumably normal non-syphilitic individuals reported positive results. One of these they conclude was an incidence of a biologic false-positive reaction confined exclusively to one test and the other represented a laboratory error. "This simple fact shows what laboratories can and should do." The number of false-positive reactions will, of course, be slightly increased when all types of abnormal patients are examined.

Positive serological reactions in a syphilitic person previously sero-negative indicates relapse or progression of the infection. Resumption of therapy is indicated.

When positive tests are reported in a case, the clinician should attempt by skillful means to determine if there is clinical confirmation of the disease. Often in this way a definite diagnosis of syphilis can be established.

When all technical and inherent or biological sources of error are eliminated and the tests are repeatedly positive, one is justified in making a diagnosis of syphilis. This is done even when there is no confirmation from the patient's history or clinical findings. The case is then managed in accordance with the functional status of the patient resulting from the syphilis or other abnormalities. Cases with partial-positive or doubtful-positive reports in whom technical and biological sources of error are ruled out are decided on a basis of history, clinical findings and future serological results in the individual patient. Usually in these ways a definite conclusion can be established. Other conditions or diseases which may cause positive reactions should be carefully sought and the tests disregarded or repeated later as indicated.

A provocate dose of a rapidly acting antisyphilitic drug may increase the amount of "reagin" in the serum. It has been reported that provocative tests give some false-positive results, but the method when considered with good judgment and experience is of value.

Consideration of the status of serological reactions on spinal fluid, serum from a suspicious early lesion, joint and other body fluids is omitted here because it would unduly prolong the discussion.

Serodiagnostic tests for syphilis are essential in the practice of all branches of medicine. They give important assistance to the clinician in the following

spheres: First, by confirming the diagnosis in those cases who have suggestive or doubtful signs and symptoms of the infection; second, for routine examination of all patients in order to detect the latent or asymptomatic ones whose histories are also negative; third, as a measure for examining population groups in epidemiologic surveys; and, fourth, a guide or control for continuing or re-instituting treatment after the "minimum standard for cure" has been administered. These fields, when expanded sufficiently, may cover the entire population and be a means of discovering the majority, approximately 85 per cent, of all syphilitics. Modern anti-syphilitic therapy quickly makes a patient non-contagious, prevents relapse, stops progression to the later stages of the disease and "cures" a high percentage of the infected individuals.

SYPHILIS IN THE PREGNANT WOMAN.*

WALTER MCMANN, M.D.,
Danville, Virginia.

"It is the disease of not listening, the malady of not marking, that I am troubled withal."

Congenital syphilis is a disease that could be held under control even as malaria, diphtheria, and yellow fever. It could be practically stamped out of existence. Whether or not this is to be done depends on measures so simple that the neglecting of them seems almost criminal.

It is very probable that the fetus is not infected before the third or fourth month. This is because "Today the diaplacental transmission of syphilis from the syphilitic mother to her fetus is assumed to be the only positively demonstrated method of infection". Reitshel, however, propounded the theory of endometrial syphilis. His belief is that there is a localization of the disease in the endometrium which is the cause of abortions and early miscarriages. As the infection becomes more latent pregnancies may go nearer term and finally a child free from lues may be delivered. Although Tow says such a theory is plausible, Crossen finds syphilis of the endometrium to be rare, while Frank makes the statement that there has been only one authenticated case of syphilis of the uterine body.

For a fetus to become infected with the treponema pallidum the mother must have syphilis. This statement is no doubt anxiomatic. Even today, however, some physicians have cited cases in which they believe the infection of the child comes straight from the father. There have been cases reported too, in which no syphilitic signs or symptoms could be demonstrated in the mother whilst the child had congenital syphilis. In the first place, the infecting organism is three times as large as the head of the sperm (a spore form cannot be denied but is not conclusive); secondly, although treponema have been demonstrated in the seminal fluid, none have been found in the fetus before the fourth month. The explanation for such cases as Waugh's of non-syphilitic mothers of luetic children must be that there was an exacerbation of the disease after impregnation with a return to the latent stage. In taking a history many women do not realize they have lues because often the first and second stages are not demonstrable.

So the first step in the eradication of the plague of congenital syphilis depends on the mother. She must see her physician early in pregnancy for examination.

A *blood Wassermann should be taken on every pregnant woman presenting herself for prenatal care.* This has been done for some time in clinic practice but the private practitioner has been rather negligent in this respect. Exner, in 1936, by means of a questionnaire, found only 51 per cent who made it a routine. I venture to say this percentage has risen considerably because of the recent public health campaign. It is such a simple thing to do. In Virginia the cost of the examination is a three-cent stamp. I have had no patient refuse. Sometimes when the blood was not taken at the first visit the patient has asked why I didn't. When the question is asked, "Why are you doing this," I have told them it was for a blood examination, and that has seemed to satisfy.

In the prenatal clinic, almost 100 per cent colored, at the Danville Department of Health, of 427

*From the Prenatal Clinic, Department of Public Welfare, Danville, Va.

patients admitted, ninety-nine had positive Wassermanns, a percentage of 23.2 per cent positive. This compares with McCord at the Grady Hospital in Atlanta who found 22.5 per cent positive. The colored population of Baltimore must not be as badly infected as Danville and Atlanta, Williams finding lues in 16.3 per cent.

Of 551 private patients only two patient's with four-plus Wassermanns were found, a percentage of .3 per cent. There was one other who had Wassermann reactions ranging from negative to three-plus, the majority of the reports being negative; another had one two-plus reaction, all the other specimens being negative. In two patients, because of unexplained intrauterine death of the fetus, syphilis was suspected but could never be proven.

It is our practice at the clinic to take a second Wassermann at the seventh or eighth month if the admitting Wassermann is negative. This has not been done long enough to make any statistics practrical. It should be done also in private cases. Some men just cannot remain continent.

The education of the physician to the need of routine Wassermann examination is the second step.

After finding the case, it must be treated. This, as McCord says, should be continuous and gentle. Treatment should be started as soon as possible. Of 603 women treated by the Cooperative Clinic, 91 per cent of the babies were apparently non-syphilitic if treatment had been started before the fifth month. After the fifth month only 62 per cent were seemingly free.

Syphilis in the pregnant woman, after all, is syphilis. There should be no deviation from the regular routine except it should be not quite as vigorous as in the non-pregnant. Arsphenamine or neo-arsphenamine should be the opening drug, then one of the heavy metals; bismuth is perhaps the best. Then the arsenical again. It is best to end the treatment with the giving of the arsenical. Zakon seems to stand alone in recommending bismuth exclusively.

A urine specimen should be examined before each treatment, and there must be careful questioning for any untoward symptoms. In the later months, if there are any pre-eclamptic or nephritic symptoms, I believe it is best that treatment be stopped. We are giving the mother drugs, not for herself, but for her baby (obviously the small amount of treatment she gets during pregnancy is not going to cure her) and for that reason I believe we should not aggravate her toxemia by antiluetic therapy. Bismuth probably aggravates more than the arsenicals.

It is generally accepted as fact that the pregnant woman tolerates antiluetic treatment better than the non-pregnant. Ingraham sounds a note of warning that maybe this is a false illusion; he is of the opposite opinion. The author believes with Hyman, however, that some of his untoward reactions could very easily have come from speed shock. The Cooperative Clinic had no bad results in 603 courses of treatment. There have been none in our clinic. Plass has cited three cases of hemorrhagic encephalitis.

Who should be treated? Every one presenting a positive Wassermann reaction, no matter what the stage of pregnancy may be. It seems rather foolish to begin treatment when the disease is found late in pregnancy and very few injections can be given; inadequate treatment, though, is better than none at all. We consider five treatments as the minimum, but, statistically, two or three have shown benefit. Also, any pregnant woman who, previous to becoming pregnant, has had syphilis, even if she has had treatment, and even if her Wassermann report is negative, should have continuous treatment. Latent syphilis is the bane of the obstetrician and syphilologist. Seventeen per cent of the women with latent syphilis have luetic children.

There are many patients who will have a weakly positive reaction; Halloran in ten years found sixty-five, 6.71 per cent of his total cases. McCord says there are many negative reactions in the syphilitic woman, so he believes in treating the mildly positive; so do Halloran, Hillis and Benersohn. That has been our policy. The question sometimes arises whether a woman should be treated or not when her husband has syphilis and it cannot be demonstrated in her. I do not think so; neither does Barksdale.

Until recently all these treatments were given in the prenatal division of the Department of Public Welfare. Because of the lack of space and of time and to systematize matters more, they are given now in the venereal division. I am not so sure that this is a good policy. The obstetrician is not able to follow the cases as he should. Also, because two separate clinics have to be visited the patient may neglect one for the other. And, in the teaching hospital, the interne and student will not be able to follow his case through and gauge results. We

XUM

shall know more about the wisdom of the change after a year or so.

Results are the things that count. In treating the syphilitic pregnant woman (adequate treatment) we are practicing preventive medicine that is almost 100 pre cent preventive. Congenital syphilis can be practically stamped out.

Positive Wassermanns were found in ninety-nine patients reporting to the clinic. Of these, nine had miscarriages. Only one patient, however, had adequate treatment and hers was the minimum, five doses of "neo" and five doses of bismuth. She miscarried at the fifth month. Five had no treatment. There were six patients that had still-births. Two had adequate treatment. I do not know the details of the deliveries. Two had no treatment.

There were four patients who delivered living children that died. One of those had adequate treatment; two had none.

There was one therapeutic abortion (not for the syphilis) and two patients did not return.

Eliminating the therapeutic abortion, those lost and the ones having inadequate or no treatment, we had eighty-one patients that had what we call minimum adequate treatment—five doses or over of neo-arsphenamine plus five doses of bismuth. Most had above the minimum. Of those four babies were lost. That means 95 per cent were saved. Of those saved, we were able to contact all but three children. These three had moved to another city. All the others were examined and serological tests made. None had congenital syphilis. X-ray studies, because of the expense, were not made. Such a salvage is worth while.

The diagnosis and treatment of congenital syphilis is beyond the scope of this paper.

After the pregnancy is over, what then? The mother is certainly not cured of her disease. I would recommend the beginning of intensive treatment again two weeks after delivery, this to be continued until the full course of treatment is over.

As in all great movements, the drive against syphilis has had a let down since the wonderful efforts in the latter years of the last decade. I hope this short communication will aid in showing the need for continued driving.

944 Main Street.

BIPARTITE PATELLA.

J. LLOYD TABB, M.D.,
DONALD M. FAULKNER, M.D.,*
and
CHARLES D. SMITH, M.D.,
Richmond, Virginia.

Bipartite patella is a term applied to an anomaly of the patella which is not commonly found, but when discovered is often confused with fracture. This is probably because the condition is practically never brought to attention except following an injury to the knee. Its recognition, however, is of importance both from a medico-legal and economic viewpoint.

The condition was first described, according to Neviaser,[7] in 1883. Its antiquity was demonstrated in 1902 by Kempson,[5] who found evidence of it in an Egyptian mummy, and the first X-ray demonstration of the anomaly was made as early as 1903.[9] Attention was again called to it during the World War when many soldiers were found to have the anomaly.[8] Since that time occasional articles and case reports have appeared discussing the condition. Five cases that we have seen in the past year have prompted this communication.

The patella is considered to be a sesamoid bone,[2] and develops from one or more centers in the quadriceps tendon. It appears about the third year and ossification is complete at puberty. It seems reasonable to assume that occasionally the patella might arise from more than one center just as other sesamoids do. (The most notable counterparts are the sesamoids under the head of the first metatarsal bone.) Contrary to this theory Todd and McCally[10] failed to find more than one center of ossification while dissecting the cadavers of six children. They felt, however, reasonably enough, that the number of subjects was insufficient to draw conclusions. A

*We regret to record the death of one of the above authors, Dr. Donald M. Faulkner, since this paper was submitted for publication.

XUM

number of writers,[3, 6, 9] associate the condition with osteochondritis, especially of the tibial tuberosity. They support this contention by quoting cases in adolescents where anomalies of the patella are found in association with undoubted Osgood-Schlatter's

Fig. 1

disease, but fail to account for the occurrence of the condition in people beyond the age when the epiphyses usually close. Köhler[3] also states that general growth retardation may be a factor and that a familial tendency has been noted.

Salmond[8] discussed cases seen during the war. Most of these were found in patients with a minor complaint of "Something unusual about the knee joint." Todd and McCally also noticed that the condition in soldiers was of such nature that malingering was often suspected, and that symptoms came on most frequently after a route march. Although they described some cases with swelling, it was not marked, and neither redness nor heat was present.

The condition has been discovered in patients ranging from childhood to the sixth decade.[4] Men seem to be most frequently affected. This, however, is probably due to the generally greater strenuous activity of men and, therefore, more frequent injuries necessitating X-ray of the knee. No information could be found concerning the racial incidence.

The anomaly may assume various shapes and combinations. The simplest form is the emarginate type, without a secondary center (Fig. 3-C). The most common type, on the other hand, is composed of a larger main portion and a smaller portion, lying, most often, in the upper outer quadrant (Fig. 3-A). Rare and sometimes bizarre combinations are found, and the opposite patella may or may not be involved; but, if involved, it may present a different design.

The patient is usually seen following an injury to one knee. Cognizance of the condition will enable a careful examiner to suspect the nature of the trouble. Point tenderness over the upper outer angle of the patella is pointed out as a valuable sign,[1] but more important, perhaps, is the lack of a demonstrable increase in fluid, since it is rare that a fracture of the patella is unaccompanied by a bloody effusion in the knee joint. Confusing is the case where there is a sprain or tear of the lateral ligaments of the knee or an injury to the meniscus, which causes joint effusion, and a bipartite patella. Here an X-ray of the opposite knee is often very helpful in the selection of the proper treatment. Helpful

Fig. 2

also in the diagnosis is the testing of active extension and passive flexion of the knee. With any fracture of the patella, either of these will cause increased pain. Also, as a rule, if fracture is present, there will be acute pain on pressure over the fracture line or on motion of the patella.

Confirmation of the clinical diagnosis must be made by radiography. The lesion, usually in the upper outer quadrant, is a rare site for fracture. Outlines of the anomaly are smooth and consist of cortical bone, whereas a fracture will have serrated edges of cancellous bone. In four of our five cases, the lesion was bilateral indicating the value of radiographing the opposite knee.

showed tenderness over the dorsal spine, but no limitation of motion. Both quadriceps tendons showed a definite atrophy. There was no point tenderness about the knee nor any limitation of normal motion, but the extremes of motion produced some pain. There was slight capsular thickening of the right knee only.

Impression: Early osteo-arthritis of both knees

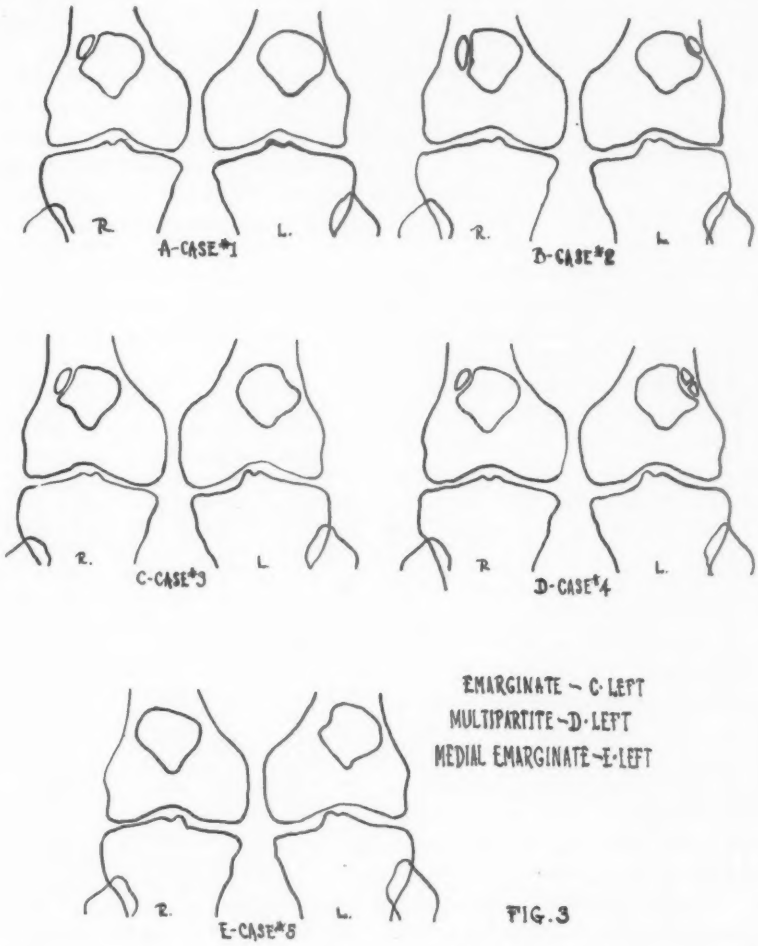


FIG. 3

Case 1. I.W.J. This was a white male, age forty-four years. His family history was negative. For three months prior to our examination he had had soreness in both knees and moderate stiffness. Weight-bearing, strain, or twisting caused an accentuation of symptoms. He had also noticed some stiffness in his back which was worse with exercise and was relieved when lying down. Examination and dorsal spine. This was substantiated in the radiographs, but, in addition, anomalies of both patellae were discovered (Fig. 3-A).

Case 2. R.W.W. This was a white male, age seventeen years, with a history of several previous injuries to the right knee. The family history was negative. On January 28, 1939, while playing basketball, he fell and apparently dislocated his

right patella. He was examined in another city, a diagnosis of patella fracture was made, and a cast was applied. Two days later he was seen by us. Examination elicited only a slightly swollen knee without any evidence of fluid or other physical sign of fracture.

Impression: Dislocation of the patella with sequellae. X-ray examination showed patella bipartita as seen in diagram (Fig. 3-B).

Case 3. G.H.S. This was a white male, age twenty years, who injured his right knee on September 16, 1939, in a football game. His knee was painful and slightly swollen. He was considered to have a tear of the internal collateral ligament. X-ray of the right knee revealed no bone abnormality except an anomaly of the patella. The other knee was X-rayed and the patella outlines can be seen in Fig. 3-C.

Case 4. A.G. This was a white male, age sixteen years. His family history was negative. The patient had noticed soreness and stiffness of the right knee for four months, more marked after exercise. There had been some occasional soreness in the left knee, but this had been negligible. For one month the soreness in the right knee had kept him from active exercise. He stated that the right knee would occasionally give way and cause him to fall. Acute flexion caused pain, but there had been no locking.

Examination showed local tenderness to pressure over the upper outer quadrant of the right patella, but no fluid was present in the knee joint. Some pain was experienced with acute flexion. Moderate tenderness was elicited over the upper outer quadrant of the left patella.

X-ray examination showed anomalies of each patella. The right has two secondary centers (Fig. 3-D). No osteochondritis could be made out on the film, though a low grade form of this disease may have accounted for the symptoms.

Case 5. J.T. This was a white male, age twenty-four years. The family history was negative. In 1929, while playing football, he dislocated his patella, but it reduced itself spontaneously. Since that time he had had about five injuries to the knee, all with spontaneous recovery. On October 6, 1939, while wrestling, he sustained an injury to the left knee. The knee again reduced itself spontaneously, but he got no relief from pain.

Examination revealed that his left knee locked at 160 degrees and there was acute tenderness over the internal semilunar cartilage and the internal lateral ligament. Slight effusion was present with pain on any motion. The patella felt irregular as if notched at the upper inner angle.

Impression: Dislocated semilunar cartilage and possible anomaly of the patella. The outline of the patella (Fig. 3-E) shows a medial upper angle defect of the emarginate type, an unusual location. The anomaly is considered a coincidental finding.

Five cases of bipartite patella have been presented. The condition is seen often enough to make accurate recognition of it important from a medico-legal and economic viewpoint, especially since most are seen following an injury about the knee. The importance of radiographing the opposite knee is stressed.

BIBLIOGRAPHY

1. Adams, John D., and Leonard, Ralph D.: A Developmental Anomaly of the Patella Frequently Diagnosed as Fracture. *Surgery, Gynecology and Obstetrics;* 41: 601, 1925.
2. Gray's Anatomy (Da Costa), Lea Bros. and Co. Philadelphia and New York; page 231, 1905.
3. Hawley, George W., and Griswold, Arthur S.: Larsen-Johansson's Disease of the Patella. *Surgery, Gynecology and Obstetrics;* 47: 68, 1928.
4. Hellmer, Hans.: Patella Partita. *American Journal of Roentgenology and Radium Therapy;* (abstract); 16: 384, 1926.
5. Kempson, F. C.: *Journal of Anatomy and Physiology;* 36: 149, 1902. (Quoted by L. D. Smith).
6. Köhler, Alban: Roentgenology, William Wood and Company, page 180, 1935.
7. Neviaser, J. S.: Bipartite Patella, *Annals of Surgery;* 94: 150, 1931.
8. Salmond, R. W. A.: The Recognition and Significance of Fractures of the Patellar Border; *British Journal of Surgery;* 6: 463, 1918.
9. Smith, L. D.: Bipartite Patella, *New England Journal of Medicine;* 212: 331, 1935.
10. Todd, T. Wingate, and McCally, W. C.: Defects of the Patellar Border; *Annals of Surgery;* 74: 775, 1921.

Second and Franklin Streets.

PYRUS MALUS, BELONGING TO THE SUB-ORDER OF POMACIAE, OF THE NATURAL ORDER ROSACEAE.*

W. O. BAILEY, M.D.,
Leesburg, Virginia.

The apple is a fleshy, indehiscent, syncarpous fruit with the calyx attached. It has an outer epicarp, a fleshy mesocarp and a scaly or horny endocarp enclosing the seed.

When the *Journal of the American Medical Association* for November 13, 1937, announced briefly, "The evidence which is now available indicates that the apple is useful as a therapeutic agent in the dietary management of diarrhœa," another epoch in therapeutics had arrived. The *Journal* failed to complement this by saying that the apple is also useful as a prophylactic agent.

In this paper I claim no originality. The work is largely that of Ira A. Manville, M.D., Ph.D., Clinical Instructor in Medicine and Director of the Nutritional Laboratory, University of Oregon School of Medicine. I have tried to simplify it for presentation in the hope that the apple will receive the place it justly deserves both as a food and as a medicine.

Historically the apple† needs no introduction. It appears to have been used in most times by most peoples. The crab-apple is probably the progenitor of all apples.

In 1906 the Department of Agriculture published a bulletin containing the chemical analysis of American food materials. The analysis of the apple was as follows:

Water	84.6	Fat	0.5
Ash	0.3	Carbohydrate	13.0
Protein	0.4	Fiber	1.2

In the discussion of the apple twelve points and a conclusion present themselves for consideration. These are enumerated immediately below in sequence:

I. The Apple in Constipation. In constipation large doses of apples are given. The first result of its administration is to increase the pH of the intestinal tract and inhibit or kill bacteria. The second result is to produce a bland, plastic, semi-gelatinous bulk which stimulates intestinal activity. This stimulation is quite different from that produced by cellulose; this is physiological stimulation. Cellulose is harsh and rough. Often it may cause erosion; sometimes it causes intestinal obstruction. In the formation of this plastic bolus water is absorbed from the tissues. As water is sucked in bacteria and toxins come with it.

II. The Apple in Diarrhœa. For the cure of diarrhœa the apple is given in small doses. The colloids, pectin and hemi-cellulose, combine with water and hold it. With the water bacteria and toxins are engulfed. This removes the etiology.

Ingested material of this sort may pass through the intestine unchanged or part of it may be changed by enzymes and bacteria into uronic acid. After absorption the uronic acid thus formed may be used in the process of detoxification or it may be used in the manufacture of materials essential for the body. The amount of apple digested varies with the amount fed.

The pectin in the apple performs two functions in this particular: (a) the digested portion produces a systemic chemical effect and (b) the undigested portion a laxative effect.

III. Cellulose. Cellulose forms a large portion of the cell wall of plants. It is extremely insoluble. Its molecule is much more complex than the starch molecule. It consists of a chain of beta-glucose units joined together in glucoside union at the fourth carbon atom. X-ray studies indicate that cellulose is a crystalline structure and consists of bundles of long chains running parallel to the fibre length. Some of it may be transformed into fatty acids. It is utilized by the animal organisms as follows:

(a) Herbivora ---------- 25%
(b) Carnivora ---------- 5%
(c) Man ---------- The part played is too small to be of any importance in diet.

Cellulose has been given a place in the treatment

*Read before the seventieth annual session of the Medical Society of Virginia, at Richmond, October 3-5, 1939.

†THE COMMON APPLE belongs to the Pome Family (Pomacae) and includes apples, pears, quinces, etc. Apple (Malus); Pear (Pyrus); and Quince (Cydonia).

XUM

of constipation which it does not deserve for the following reasons:

(a) It is not a source of uronic acid.

(b) It is insoluble in water.

(c) It injures delicate intestinal mucous membrane.

(d) When cellulose is absent from the diet constipation seldom results, i. e., when foods are strained to remove seeds, skins and stringy material.

(e) There have been thirty-nine cases of food obstruction reported in the *Journal of the American Medical Association* from 1910-1932 from indigestion of cellulose.

(f) Three or four years ago four cases of intestinal obstruction were reported due to the indigestible portion of oranges.

IV. The Uronic Acids. Upon hydrolysis hemicellulose yields uronic acid. The following is the uronic acid content of some foods:

(a) Cereals 1-2%	(e) Fresh vegetables 7-18%
(b) Two varieties of melons ... 3-4%	(f) Apples and pears 4-6%
(c) Legumes 4-5%	
(d) Potatoes 2-4%	

The common American menu—cereal, coffee, potatoes, gravy, meat, pastry, bread and butter—provides but little uronic acid. The body synthesizes uronic acid to a small degree but foods must supplement it.

Such chemical substances as uronic acid alter materially the availability of toxins for absorption and, if absorbed, accelerate removal from the blood stream by:

(A) Facilitating urinary secretion.

(B) Deposition in the tissues in a relatively harmless form.

(1) Glycuronic Acid. Glycuronic acid is obtained from glucose by oxidation or it may be obtained by the hydrolysis of chondrosin or from glycogenetic amino acids. It consists of one aldehyd radical, four alcohol radicals, and one acid radical. This oxidation takes place in the liver. It aids the body to get rid of certain toxic drugs such as antipyrin, menthol and camphor. These drugs are chemically linked to glycuronic acid through its aldehyd radical; the products, various glycuronates, are excreted in the urine. In its processes of conjugation, glycuronic acid renders toxic substances less toxic or non-toxic but, in addition to this, according to Quick, conjugation with glycuronic acid yields products which are much stronger acids than the original substances which were presumably detoxified. This must mean that a weak acid which the body cannot excrete is converted into a strong acid which the body can eliminate.

In addition to forming conjugation products, glycuronic acid must be engaged in important metabolic processes because the body synthesizes it at the extraordinary rate of nearly one gram per hour.

When glycuronic acid is acting as a detoxifier it is never in a free state. It is always conjugated with such materials as mucin, chondroitin, heparin, etc. When it is excreted in the urine it is always conjugated with alcohols, phenols, ketones, acids, etc., which are: (a) products of metabolic activity, (b) products of bacterial activity, or (c) due to the presence of intestinal toxic material.

(2) Galacturonic acid is obtained from pectin by hydrolysis.

V. Hemi-cellulose. Hemi-cellulose differs from the other polysaccharides in not being readily digestible by amylases. Upon hydrolysis it yields uronic acids, pentoses or hexoses, or both. Bacteria are efficient hemi-cellulose transformers.

VI. Lysozyme. The enzyme lysozyme is bacteriocidal and bacteriostatic. It dissolves, in varying degrees, practically all bacteria. Nearly all mucous membranes produce it. It is found in the nares, the saliva, tears and in the large intestine. In the large intestine it is manufactured in the cells of the mucous membrane. From here it is carried to the intestinal lumen. Here it acts upon bacteria.

If there is vitamin A deficiency the mucous membrane can't produce mucous. Certain interesting things then take place:

(a) Lysozyme accumulates in the mucous membrane and is deficient on the surface. If menthol is injected into the animal, lysozyme is increased nearly four times more than it would be in the normal animal. Menthol withdraws the essential constituent for the manufacture of mucous. Lysozyme accumulates at a point in the tissues where it is not able to exert defensive activity.

(b) If the animal is given apple the lysozyme remains at its normal level and the animal is protected against a deficiency and against menthol poisoning.

Sometimes one's own metabolism won't neutralize

XUM

toxins. Upon these occasions the body must depend upon protective foods—vitamines, minerals, uronic acid and certain amino-acids.

VII. Pectin. The pectins are colloidal carbohydrates which, with the proper concentration of acid and of sugar, form fruit gels. To form a gel there must be 0.3-0.7 per cent pectin, 65-70 per cent sugar (usually sucrose) and a pH of 3.2-3.5 per cent. Commercial pectin is prepared from apples and lemons. Upon hydrolysis, pectins yield: (a) galactose, (b) galacturonic acid, (c) arabinose, acetic acid and methyl alcohol. Pectin's chief value is as a detoxifying agent. Pectin, once exposed to processes necessary for its extraction, probably does not possess the same value as in its natural state.

In the dehydrated apple the following are the anhydride values:

(a) Pectin ------58.3%
(b) Hemi-cellulose -------19.5%
(c) Unknown ---22.2%

Since pectin's chief value is as a detoxifier it is important to know the origin of the various toxic materials which may occur in the body from time to time. They are as follows:

(a) Toxins of metabolic origin. Toxins which develop during the female menstrual cycle.

(b) Toxins arising from bacterial decomposition of foodstuffs—indole and skatole. These are rendered harmless before they are excreted by the urine.

(c) Toxins entering the body with the food, such as benzoic acid or the products of bacterial decomposition.

(d) The toxins taken into the body in the shape of drugs, such as aspirin or amidopyrine.

(e) Toxins produced in the body as a result of bacterial invasion, as the toxin liberated by the diphtheria organism.

VIII. The Relationship of the Diet to the Self-Regulatory Defense Mechanism:

(a) Fresh fruits as pre-meals and as additions to basal diets influence the human organism as follows:

(1) The hydrogen-ion concentration.
(2) The bacterial flora.
(3) The auto-regulatory defence mechanism of the gastro-intestinal tract.

(b) It must be noted, however, that fresh fruits vary considerably as follows:

(1) As to the locality from which they are procured.
(2) The variety differences.
(3) Differences in age.
(4) As to vitamin content.

(c) In experimental work it becomes necessary to use a standardized product. Dehydrated apple powder is a substance of known composition. It is therefore used for this purpose.

(d) The benefits derived from fresh fruits are one of the following:

(1) Hydrogen-ion content.
(2) Carbohydrate content (organic acids, cellulose, hemi-cellulose, pectins, lignin, etc.).

(e) In the consideration of hydrogen-ion content the following must be considered:

(1) Organic acids in the fruit itself. There may be a great many of these.
(2) Other acids which may be produced by the enzymes of intestinal bacteria plus carbohydrate, such as lactic, acetic, butyric acids, etc.

(f) Certain interesting, instructive and important experiments have been performed upon man and animals to determine the effect of vitamin A deficiency and acid depletion in relationship to lysozyme content of tissues and secretions. In these experiments dehydrated apple was used on account of its stability. Some of these experiments and conclusions are in the Addendum of this paper marked "A". Briefly, the following facts may be deduced from these experiments:

(1) In an acid medium exogenous bacteria lose their viability.
(2) When an alkaline buffer solution is introduced into an acid medium and it is changed to alkaline, bacteria regain their viability.
(3) Seidman and Arnold demonstrated with rats, which were vitamin-deficient, a denser bacterial population and a more alkaline pH than normal.
(4) Arnold, Bergeim, Hanzen and Arnold and Esselen found the pH in the intestinal tract raised and the viable Esch. coli decreased when fruits such as banana, apple, cranberry, prunes, etc., were fed.

IX. Interrelationship of Vitamin A and Glycuronic Acid in Mucine Metabolism: Before beginning a discussion of this interrelationship it would be best to refute the allegations of certain reputable work-

XUM

ers in this field. In 1932 in the *Journal of the A.M.A.*, Mendel stated that apples were only a fair source of vitamin A while oranges were a good source. Dr. M. A. Bridges placed apples along with foods deficient in vitamin A such as: bacon, white cabbage, blanched celery, cucumbers, onions, etc. Sherman, in the fourth edition of his book on "Chemistry of Food and Nutrition" gave apples a vitamin A potency of fifteen units per ounce. The table below is the result of the work of Ira A. Manville, M.D., Ph.D., of the Oregon School of Medicine. It disproves the statements above:

Variety of Apple	*Vitamin A units per ounce*
Arkansas Black	36
Baldwin	15
Delicious	24
Gravenstein	14-17
Jonathan	24
Rome Beauty	12
Spitzenburg	36
Stayman	17
Winesap	36
Yellow Newton	34

DIPLOID

Variety	*Vitamin A*	*Vitamin C*
Spitzenburg	34-36	7
Yellow Newtown	34	6
Winesap	26-36	2-3
McIntosh	33	1
Golden Delicious	30	2-2.5
Delicious	24	2-3
Jonathan	24	1.5-2
Stayman	17	2.5
Starking	16	*
Rome Beauty	12	2.5
Lane's Prince Albert	*	3
Newton Wonder	*	3
Cox's Orange Pippin	*	1.5
King Edward	*	1.5
Worchester Pearmain	*	1.5

TRIPLOID

Variety	*Vitamin A*	*Vitamin C*
Arkansas Black	36	2
Gravenstein	14-17	3.75
Baldwin	15	2.5-3.0
Belle de Boskoop		6-10
Bramley's Seedling	*	6-10
Gennet Moyle	*	3-6
Reinette de Canada	*	3
Blenheim Orange	*	1.5-3.0
Ribston Pippin	*	1.5-3.0
Warner's King	*	1.5-3.0

*Vitamin value undetermined.

Before the apple is condemned as an efficient source of vitamin A it should be remembered that Sherman assigns a value of twenty units per ounce to the orange. There are six varieties of apple in the above table which exceed this value, several by more than 50 per cent.

A deficiency of vitamin A produces certain metaplastic changes in the epithelium of mucous membrane:

(a) Xerosis, (b) keratinization, (c) desquamation, and (d) an increase of the number of desquamated epithelial cells in the conjunctival sac and the urinary sediment (vitamin A deficiency).

(b) The mucous membrane of the gastro-intestinal tract does not show vitamin A deficiency so readily but there are certain changes which do indicate this deficiency, manifested as follows:

(1) Marked reduction in the number of mucous secreting elements.

(2) Increase in the number of goblet cells.

(3) Reduction of mucus exposes the lining membrane of the pylorus of the stomach, and especially of the large intestine, to injury by food and feces. This results in capillary bleeding and bloody stools. This is the earliest evidence of vitamin A deficiency.

(c) The prosthetic portion of the mucine molecule is glycuronic acid. Failure to produce mucus might be due to insufficient glycuronic acid. It is probably not due to lack of protein.

Other facts and conclusions relative to this Interrelationship of vitamin A and glycuronic acid will be found in the Addendum marked "B".

X. Pectin as a Detoxification Mechanism:

(a) This basis for pectin lies in the fact that the pectin molecule gives rise to eight galacturonic acid molecules and galacturonic acid acts as a detoxifier quite as well as uronic acid.

(b) For the last few years in the United States we have been feeding raw apple pulp for the treatment of infantile diarrhœas. Pectin is probably responsible for the therapeutic effect. The Germans have been using raw apple pulp for infantile diarrhœas for ten years. One of the reasons for the efficacy of pectin as a detoxifier is its high absorptive power.

(c) Malyoth thinks that galacturonic acid acts similar to glycuronic acid as a detoxifying mech-

anism. For fifty years it has been known that glycuronic acid is of the utmost value in the detoxifying mechanism of the body. When this function is exercised glycuronic acid is never in a free state. As has been stated previously, it is always conjugated with such material as mucine, chondroitin, heparin, etc. Glycuronic acid is constantly excreted in normal urine in small amounts. These are always conjugated with alcohols, phenols, ketones, acids, etc.

(d) Other facts relative to pectin as a detoxifier are in the Addendum marked "C".

XI. Certain General Points:

(a) Cellulose, hemi-cellulose, pectin, lignin and the pentose sugars possess caloric value.

(b) Excerpt from an address by T. Wingate Todd to the American Dietetic Society in 1935:

(1) "Vegetables seem to have had a checkered career. Hollingshed remarks that 'Herbs, fruit and roots' were plentiful in England in the time of Edward I (1272-1307). But during the reign of Henry VIII (1509-1547) they were so scanty that when Queen Catherine wanted a salad she had to send a messenger to Holland for the necessary ingredients. Cultivation, however, was then reviving and melons, gourds, carrots were already available. In Elizabeth's reign during the last half of the sixteenth century, broccoli was brought from Italy; cauliflower from Cyprus; cucumbers and spinach from Flanders; and potatoes from America. Close hearted cabbage arrived from Holland in the seventeenth century, and early in the eighteenth century Marshall Mallard, captured at Blenheim, had his favorite vegetable, celery, planted for his use while a prisoner in England. Scotland was even less fortunate. Of common vegetables there were scarcely any of those in use today. Turnips were imported. There were no onions. Potatoes were cultivated only in the gardens of a few. Parsnips and greens were only used in soup. Vegetables were not served at the table at all. In Queen Elizabeth's reign very few of the foods now regarded as indispensable were to be obtained with the exception of meat, fish, bacon, eggs and butter. Tea, coffee, and cocoa had not been introduced."

(2) To quote Dr. Todd further—speaking of the gentry and nobility of England of that day who led almost a vegetable and fruit-free diet:

(a) "There they all were, a host of loutish persons of uncertain temper, blotchy, unlovely faces and staggering blood-pressure, whose physicians cupped them by the quart; who, despite their sagging paunches, scurvy skins, their self-indulgence and barbaric jokes, knew well how to choose an architect, create townscape or conduct a ceremonial affair. The blotchy, pimply faces, swollen hideous noses, eczema and and skin diseases, associated with intellectual quotients of no mean order, were the eighteenth century counterparts of what we call allergy today. All these afflictions arose from dietetic indiscretion and faulty preparation of food."

(3) Certain amplifying and additional general points are in the Addendum marked "D".

XII. Mechanisms that Hinder or Prevent the Access of Bacteria to the Tissues:

(a) A detailed consideration of these mechanisms is put in the Addendum marked "E".

(b) These mechanisms of first line defence are based briefly upon (1) the presence of an acid medium, (2) the presence and the availability of lysozyme and the constancy of the indigenous bacterial flora, its mutability and its pathogenicity.

(c) Any protective food which is protein-sparing, acid-producing palatable and attractive is the logical auxiliary of this first line of defence.

CONCLUSION

(a) The apple is valuable in medicine as:

(1) A prophylactic agent.

(2) A therapeutic agent.

(b) The apple is palatable, attractive in appearance and widely and constantly available.

(c) It possesses the peculiar faculty of being signally effective in two diverse diseases—constipation and diarrhœa.

(d) It produces uronic acid which is (1) protein-sparing and (2) which renders toxins less available for absorption.

(e) It tends to render lysozyme production, maintenance, availability and distribution constant.

(f) It is one of the best producers of vitamin "A" that we possess among the fruits. Six varieties of

apples produce 50 per cent more vitamin "A" than the orange.

(g) In its prescription, consideration should be had not only for the variety of the apple but its attributes in the following:

(1) Vitamin "A" content.
(2) Vitamin "C" content.
(3) Pectin content.
(4) Uronic acid-producing potentialities.
(5) Availability.

(h) Its pectin is a valuable detoxifier.

(i) In the body's first line of defence against bacterial invasion it is an invaluable auxiliary.

(j) It deserves to be studied more exhaustively and should be used as frequently as a condiment is used.

(k) The apple brings about many changes, if not all the changes, in the intestinal flora which were claimed by Metchnikov for buttermilk.

(l) No table should be set without the apple upon it in some form.

Addendum "A"

THE RELATIONSHIP OF THE DIET TO THE SELF-REGULATORY MECHANISM

These observations and conclusions are as follows:

(a) Bienstok found that in laboratory animals the upper half of the small intestine was comparatively free of bacteria compared to the lower half.

(b) Gessner drew similar conclusions with the human gastro-intestinal tract.

(c) Scheutz, to test the auto-sterilization mechanism, introduced B. Metchnikovi in the duodenum of dogs. He found that the organisms were killed before reaching the ileum.

(d) Rolly and Liebermeister used B. pyocyaneus in rabbits. They substantiated Scheutz' findings.

(e) Van der Ries concluded that the defence-mechanism is one of auto-disinfection and not auto-sterilization.

(f) Arnold determined in experiments upon dogs that there was a decided interference with the bacteriostatic power of the small intestine when the following took place:

(1) The dog ingested alkalinized food.
(2) The dog ingested a high protein food.
(3) Or during the adjustment to a high external temperature or fever.

He further determined that, in the small intestine, interference with the bacteriostatic action on exogenous bacteria is accompanied by a marked disturbance in the regulation of endogenous bacterial flora. The duodenum and the jejunum were the last organs to lose this auto-disinfecting power.

When the upper part of the small intestine is suddenly alkalinized, in the presence of protein material or bile, bacteria may pass through the wall of the small intestine and appear for a short period in the thoracic duct. Puppies kept in a hot room and fed B. prodigiosus milk showed viable organisms in their stomachs. If acidified milk was fed no organisms appeared.

(g) Nedzel, Stonecipher and Arnold administered saponin to dogs and studied intestinal changes in the distribution of Esch. coli and the hydrogen-ion concentration. A sudden change took place in the acid-base equilibrium and in the endogenous flora. Viable Esch. coli appeared in the organs of the animal. As the pH increased there was a decrease in the viable Esch. coli in both the intestinal contents and organs.

(h) Nedzel and Arnold and Johnson and Arnold found that exogenous bacteria such as Esch. coli, when introduced into the stomach in the presence of free hydrochloric acid, lose their viability. However, when a buffer alkaline solution such as sodium phosphate was introduced, the prevalent non-viable bacteria regained their viability.

(i) Johnson and Arnold made several interesting observations:

(1) Suspend test bacteria in a saline, milk and phosphate buffer solution.
(2) An acid deficit is present at the beginning. If this persists at the end of one hour, there are 150,000 bacteria per cc.
(3) As soon as free HCl is detected no viable organisms can be demonstrated.
(4) When alkaline phosphate solution is added to neutralize free acid, viable organisms reappear and persist during the period of the acid deficit.
(5) If the gastric contents are removed when free acid is present, and the solution then neutralized, no viable bacteria can be demonstrated.

(j) Seidman and Arnold demonstrated with rats which were vitamin deficient, a denser intestinal bacterial population and a more alkaline pH than normal.

(k) Arnold and Bergeim, Hanzen, Arnold and Esselen found the pH in the intestinal tract raised and the viable Esch. coli decreased when fruits such as banana, apple, cranberry, prunes, etc., were fed.

Conclusions:

(1) The apple brings about many changes, if not all the changes in the intestinal flora which were claimed by Metchnikov for buttermilk.

(2) It supplants the putrefactive organisms which are capable of producing toxic and irritating materials.

(3) Evidence appears to be increasing that cellulose, hemi-cellulose and perhaps pectin, to some extent, can be broken down in the intestine with the liberation of certain organic acids, acetic, lactic, butyric, etc., which may have specific bactericidal and bacterio-static value.

(4) Any dietary regime producing an intestinal reaction favorable to the growth of the aciduric type of organisms and detrimental to the development of putrefactive processes should be favorably regarded.

(5) Foods whose residues in the intestinal canal can give rise to substances inhibitory to gas production are important.

(6) Addition of dehydrated apple to the diet of other workers using other fruits, manifested as folrabbits gives results similar to those obtained by lows:

(a) The apple increased the pH in the intestinal contents.

(b) The intestinal flora was changed from one in which Esch. coli predominated to one in which the acidophilic type of organism predominated.

(c) The gas producing type of organism was considerably reduced.

(d) After forty-two days of an apple diet there was change in the cellulose-splitting flora of either the Esch. coli or the acidophilic type of organism.

Addendum "B"

THE INTERRELATIONSHIP OF VITAMIN A AND GLYCURONIC ACID IN MUCINE METABOLISM

1. The sources of glycuronic acid are:

(a) Endogenous—synthesized from glycogenic amino acids.

(b) Exogenous—present in food material. The presence of glycuronic acid in foods is important because it can be provided in larger quantities and supplied faster than that obtained from endogenous metabolism.

(c) Deplete glycuronic acid in animals by placing thirty-six rabbits on a diet of oatmeal and water:

(1) Gradually increase doses of menthol administration, injecting it three times a day. As a result menthol-glycuronate is formed. This is excreted in large extent by the kidney.

(2) When no more exogenous or endogenous glycuronic acid was available intoxication resulted:

(a) Animals surviving two to four days showed on autopsy: (1) ulcers of the stomach, pylorus, gall-bladder, small and large intestines. These findings resembled those found in vitamin A deficiency.

2. Conclusions:

(a) Toxins from any source causing erosion and ulceration of the gastro-intestinal tract must be conjugated with glycuronic acid for their detoxification.

(b) Demands of detoxification take precedence over demands of mucine production. Therefore, when sufficient toxins accumulate, erosions and ulcers of the gastro-intestinal tract will follow.

(c) Conjugation of glycuronic acid and toxins occur in the liver. Impaired hepatic function will predispose to earlier mucosal damage.

(d) Cells cannot produce mucus if there is vitamin A deficiency.

(e) Mucous membranes cannot produce lysozyme if there is vitamin A deficiency.

(f) It is not inconceivable that bacteria may enter and multiply in the respiratory system or the sinuses in vitamin A deficiency as well as in the gastro-intestinal and urinary tracts.

(g) If ulcerations and erosions do occur in the gastro-intestinal tract (a) secondary anemia may result or (b) secondary bacterial infections.

(h) The increase of winter respiratory infections may be due to the depletion of vitamin A reserves built up in the summer.

Addendum "C"

PECTIN AS A DETOXIFICATION MECHANISM

1. A large number of experiments have been made in an attempt to ascertain the virtues of pectin not only as a detoxifier but as a sparer of protein. Rabbits were fed oatmeal exclusively to deplete the

XUM

glycuronic acid reserves and then given menthol. Some rabbits were given pectin, some used as controls. The total average excretion of uronic acid by the pectin-fed rabbits was 25 per cent greater than that of the rabbits fed menthol only. But, in addition to this, the protein break-down in the pectin-fed rabbits was less.

2. From these experiments, and certain others, these conclusions appear to be justified:

(a) The administration of preformed uronic acid provides a better source of detoxifying material since it conserves body protein.

(b) Galacturonic acid is capable of forming conjugation products with toxic materials in the same manner as glycuronic acid.

(c) Pectin in as small doses as 3 gms. daily exerts a definite protein-sparing action.

(d) Definitely establishes for the first time the nutritive value of pectin and places additional importance upon these foods as good sources of this material.

(e) Chondroitin contains glycuronic acid as the prosthetic portion of the molecule. Its use gives (a) marked increase in intestinal activity, (2) combats menthol intoxication.

(f) Mucine has a distinctly laxative effect.

(g) Mucine, chondroitin and pectin resemble each other chiefly in their uronic acid components (the laxative effect is probably due to the protein fraction).

(h) The laxative effect of hemi-cellulose and pectins may be due to their uronic acid content.

(i) Severe injury in the gastro-intestinal tract may result from:

(1) Any defect in the body to conjugate uronates (as liver injury).

(2) Any reduction in the intake of preformed, uronic acid.

(3) Excessive production in the body or introduction into the body of toxins so that the balance between synthesis and conjugation on the one hand and toxin accumulation on the other hand is upset.

(j) Hemi-cellulose and pectins have a nutritive value clearly not caloric.

(k) Sugar acids from preformed sources are of greater value to the organism than those produced by synthesis. They are protein sparing.

(l) Sugar acids from synthesis in the body represent sacrifice of body protein and other essential precursors. Such sacrifice is self-limited.

Addendum "D"

CERTAIN GENERAL POINTS

1. Perhaps if man lived in as natural a state as animals of the field or forest, natural food materials would maintain him in a similar state of health.

2. Much of the dietetic difficulty that man has he does to himself. He departs from normal hygiene and lives upon de-naturalized foods. The essentials for the preservation of health are within foods themselves.

3. As income rises people eat more of the expensive vitamin containing foods. They eat more fruits, eggs and vegetables and drink more milk. The growth of childen is facilitated; they attain greater stature. This is due to the fact that the foods which they eat are rich in vitamins, minerals and first-class protein constituents.

Addendum "E"

MECHANISMS THAT HINDER OR PREVENT THE ACCESS OF BACTERIA TO THE TISSUES

1. The Skin:

(a) Acts as a mechanical barrier. It has a complex biological mechanism which frees it from the bacteria continuously impinging upon it.

(1) Colebrook found that H. streptococcus, B. vulgaris, Friedlander's pneumo-bacillus and B. coli were rapidly killed on the skin of the normal hand.

(2) That no chemical washing would remove bacteria from the hand.

(3) That dead skin on cadavers had lost most of its bacterial action within fifteen minutes.

(b) The mechanics of auto-sterilization are uncertain. It is probably due to the chemical properties in the sweat.

(c) Fleming noted (1922-29-32) micrococcus lysodeiktious in tears in the nasal secretion and in many tissues, including the skin. Lysozyme is thermolabile and in high dilution causes lysis of certain non-pathogenic bacteria. It is also active against some strains of staphylococcus and streptococcus of human origin. In high concentration it acts, though less energetically, on other pathogenic bacteria.

Colebrook says that the role of lysozyme in self-

disinfecting of the human skin is relatively unimportant.

2. The Mouth, Stomach and Intestinal Tract:

(a) When bacteria get in the mouth they adhere to the mucous lining epithelium of the mouth unless they are introduced with food.

(b) Mouth bacteria can persist but a few hours unless their biological characteristics permit colonization. Then they become part of the normal flora.

(c) The gastric juice imposes a barrier to bacteria going to the intestine:

(1) Arnold and Brady found erythro bacillus prodigiosus and Ps. pyocyanea when introduced in water suspensions in the stomach of a dog, twelve to eighteen hours after a meal, failed to reach the cecum but, in watery suspension, or in alkaline buffered milk, reached the cecum in large numbers.

(2) The part lysozyme plays in eliminating susceptible species from the intestinal flora is difficult to say.

(3) The intestinal mucosa is permeable to living bacteria only under exceptional conditions.

(4) Raw egg-albumin is peculiarly potent in inducing passage of bacteria not only from the intestinal lumen to the lymphatics and blood, but in the reverse direction from the bloodstream to the intestinal lumen.

3. The Nose, Nasopharynx and Respiratory Tract:

(a) The greater part of inhaled bacteria are arrested at or near the nasal orifice.

(b) The bacteria passing back adhere to the mucous film. The cilia sweep them back towards the naso- and oro-pharynx. Here they join bacteria being swept back by suction currents from the mouth.

(c) Arnold was unable to detect any bactericidal substance in nasal mucosa.

(d) Lysozyme is known to be present in high concentration in the nasal secretions and it is altogether probable that it plays a part in freeing the nasal cavities from those species of bacteria against which it is active. The nasal bacteria disappear by the same mechanism in the nose that they do in the mouth.

(e) Calamida and Bartarelli (1902) stated that the nasal accessory sinuses were sterile.

(f) The trachea and bronchi contain few, if any, living bacteria due to the filtering action of the nasal passages combined with the propensity of bacteria for adherence to the mucous walls.

(g) Dust particles containing bacteria reach the lungs. Exceptionally bacteria may reach the lungs in large numbers. The deeply penetrating ones form only a small fraction of the total inspired.

(h) Bacteria usually are driven from the vocal cords by the cilia. They reach the deeper bronchi or lung alveoli and are removed by phagocytic cells to the regional lymph nodes. Whether there is any immediate bactericidal mechanism at work we do not know.

4. The Conjunctivae:

(a) The mechanical flushing of the tears washes the bacteria out through the lachrymal duct.

(b) Maxey (1919) received erythro bacillus prodigiosus from the nose within five minutes after it was introduced in the conjunctival sac.

(c) Stort (1891) failed to recover B. coli from a rabbit's conjunctiva one hour after implantation but it persisted longer if the lachrymal duct was tied.

(d) The lysozyme content of the tears is the highest of any secretion yet examined. A dilution 1-40,000 may cause complete lysis of a suspension of micrococcus lysodeikticus. This agent suffices to rid the conjunctiva of many organisms in contact with it and plays a part in the local defence of this region against certain pathogenic bacteria (Ridley, 1928).

5. The Genital Tract:

(1) The male urethra is normally sterile. There are a few staphylococci and B. diphtheriae at the meatus. The mechanical flushing of the urine with an acid reaction is an important factor.

(2) The vagina has marked bactericidal properties due to the aciduric bacillus of Doderlein.

(a) The bacillus of Döderlein is present one to two days after birth.

6. The Flora:

(1) The flora is characteristic for individuals over a long period of time. The flora of the naso-pharynx of any given person changes in certain of its characters if observations are carried out over a sufficiently long time. The B. influenza may be carried for months and then disappear. One type of pneumococcus may give place to another; meningococci may be present for months or years and then be lost.

(2) Usually there is resistance to any stray invaders from the outside world.

XUM

(3) There are a series of mechanisms in nature of which we know but little:

(a) Flora vary in nature from one locality to another.

(b) Each locality tends to develop and maintain its own characteristic flora.

(c) Flora of any locality differ qualitatively and quantitatively from that of another.

(d) The flora of one locality (say naso-pharynx) show minor but significant differences as we pass from one person to another or study a single person over a prolonged period of time.

(e) The resistance to colonization of bacteria is important in the body's first line of defence but the effectiveness cannot be accurately estimated. After this line of defence is penetrated the body must depend upon anti-bacterial or anti-toxic immunity.

BIBLIOGRAPHY

1. Manville, Ira A., M.D., Ph.D.: The Apple in Ancient and Modern Nutrition.
2. Manville, Ira A., M.D., Ph.D.: New Developments in Nutritional Value of Apples as the Result of Research and Clinical Experience. August 11, 1936.
3. Fellers, C. R., Cleveland, M.M., and Clague, J. A.: Vitamin C Content of Baldwin Apples and Apple Products—June 1, 1933.
4. Manville, Ira A., M.D., Ph.D., Bradway, Eliz. M., Ph.D., and McMinis, Avoca S.: The Use of Apple Powder in the Treatment of Diarrheal Conditions and Its Rationale. 1937.
5. Manville, Ira A., M.D., Ph.D., Bradway, Eliz. M., Ph.D., and McMinis, Avoca S.: Use of the Apple and Apple Products in the Treatment of Summer Diarrheas and Dystenteries. 1936.
6. Manville, Ira A., M.D., Ph.D.: Use of Apple Powder in the Prevention and Cure of Summer Diarrheas.
7. Manville, Ira A., M.D., Ph.D., McMinis, Avoca S., and Chuinard, Fritzi G.: Vitamin Studies on Apples. 1934.
8. Manville, Ira A., M.D., Ph.D., McMinis, Avoca S., and Chuinard, Fritzi G.: Vitamin Studies on Apples. 1936.
9. Sullivan, Nicholas P., and Manville, Ira A., M.D., Ph.D.: Relationship of the Diet to the Self-Regulatory Defence Mechanism. 1937.
10. Sullivan, Nicholas P., M.S., and Manville, Ira A., M.D., Ph.D.: Relationship of the diet to the Self-Regulatory Defence Mechanism. 1938.
11. Manville, Ira A.: Interrelationship of Vitamin A and Glucuronic Acid in Mucine Metabolism.
12. Manville, Ira A., M.D., Ph.D.: Recent Developments in Research on Nutritive Values of Apples. August 9, 1938.
13. Manville, Ira A., M.D., Ph.D.: Pectin as A Detoxification Mechanism.
14. A Digest of Scientific Literature Concerning the Apple—Its Nutritive and Therapeutic Values. 1938. (Published by the Washington State Apple Advertising Commission, 1938).
15. Cameron and Gilmour: Biochemistry of Medicine.
16. Quick, A. J.: Biological Chemistry, 1926; 1927; 1928; 1931; 1932; 1932-1933.
17. Hawk and Bergheim: Practical Physiological Chemistry, 1931.
18. Topley, W. W. C.: An Outline of Immunity, 1935.

DISCUSSION

DR. WM. R. PRETLOW, Warrenton: Dr. Bailey's rather complete studies of the properties of the apple are quite interesting to me. I am particularly interested in that part of his paper which deals with the pharmacology and chemistry of pectin since it appears that this is the substance which is responsible for the beneficial effect of apple in the treatment of certain intestinal disorders. Apparently this substance accomplishes its purpose through several simultaneous actions. Through its influence upon the pH of the bowel, it exerts a bacteriostatic or bactericidal effect upon putrefactive organisms. It may stimulate the production of mucus, thus protecting the mucous membranes of the intestinal tract against further irritation. Through the liberation of galacturonic acid it conjugates toxins already formed. In addition, its purely mechanical absorption of toxins and bacteria seems to be of importance. Unlike many drugs which have been used in the treatment of diarrhea, pectin does not effect the normal motility of the intestinal tract and is non-toxic even when given in very large doses.

Thus, theoretically, we have in pectin a substance ideally suited to the treatment of diarrheal conditions. Practically, it measures up to its theoretical potentialities. When pectin is given in adequate dosage, the number of stools is promptly diminished and normal consistency is restored. Discomfort and toxemia are relieved and the patient is able to overcome his dehydration. There is no danger of constipation or toxic side effects. In our hands pectin has proven much more effective in the treatment of diarrheas than either scraped or dried apple. It is very important that adequate dosage be administered.

Winters and his associates, in a recent issue of the *American Journal of Digestive Diseases,* published their experimental work in dogs to which quinidine was administered in dosage adequate to produce peptic ulcers. In control dogs, ulcers were produced, while other dogs given the same dosage of quinidine but simultaneously given pectin were protected against ulcers in, roughly, 90 per cent of their cases. They further showed that ulcers produced by quinidine promptly healed when pectin was administered. Thus, it appears that pectin may be found to have a wider field of usefulness in the treatment of intestinal disorder.

DR. F. D. WILSON, Norfolk: Mr. President, truly an apple a day keeps the doctor away. The story is going

around that a physician in the South had a grandchild afflicted with a gastro-intestinal upset and loose bowels. The treatment was unavailing. Finally, when he walked in one day, he found a Negro mammy scraping an apple to give to the baby. He told her not to give it to the baby—she would kill it. She told him it had never yet killed a child and, when he asked if she had been using it before, she said she had given it to all her babies sick with loose bowels. The doctor then investigated and himself began using it, but never reported his results. It has been used in Europe for some years. For the last two years I have given acute infectious diarrhea cases in children over two years old apple powder, and I have been astounded at the results. I have seen a child with from twenty to twenty-five stools a day given apple powder get better within twenty-four hours. I have given apple powder to children with from six to eight stools a day and have seen a drop to two stools a day within a few days and then rapid recovery.

Raw apple seems to be valuable in these children over twelve months of age. Under ten months or a year it seems to give more cramp or pain in the intestinal canal than in older children and I have not used it. I tried it but do not use it any more because it did seem to give intestinal pain. I have tried the powdered apple which is on the market and like it, but it does not seem to give as good results as fresh apple.

I should like to ask Dr. Bailey to give his experience and also ask him whether there is any difference in the behavior of the various kinds of apple; whether, for instance, the summer apples we have in Virginia would be as satisfactory scraped as the winter apples which we put away and use all winter. Summer apples, of course, do not keep as well, and there may be a good deal of difference in their action.

My results with scraped apple have been very satisfactory and I also have gotten good results with powdered apple.

DR. W. P. MCDOWELL, Norfolk: For the past two years I have been using apple in the treatment of diarrheas in infants and children, though I have had no experience in the use of apple powder. Each year we see, at the King's Daughters' Children's Clinic in Norfolk, quite a large number of children suffering with fermentative and infectious types of diarrhea. It had been our custom to treat these patients with a high protein diet. While the results had been fairly satisfactory, we had some difficulty in getting these patients to take the protein milk. During the past two years we have adopted the practice of giving these patients either scraped or mashed ripe apple or banana. This method has also been used in our private practice with satisfactory results. Our experience has been somewhat different from that of Dr. Wilson, in that we do not encounter the difficulty in getting these patients to take the apple and banana. The mother is instructed to use a ripe apple, core and peel same and grind it up in a meat grinder or mash it with a potato masher. It is then fed to the patient in as large quantity as the patient desires. In the course of twenty-four to forty-eight hours the stools will usually assume a formed character and the frequency of the stools usually decreases.

The essayist has given us a very clear and scientific presentation of the subject and I have enjoyed his paper.

DR. M. B. HIDEN, Warrenton: Much has been said about the advantage of the apple to our physical being but nothing about the advantage of the apple to our mental being and I thought I might mention that. If you take the apple juice when it is absolutely fresh and add sugar to it in the proportions of one and one-half pounds of sugar to a gallon of juice, exclude air, and let that ferment, you get apple wine. That is absolutely delicious. For forty cents a gallon you can get one of the finest wines you ever drank in your life. You can get good cider in my part of the State for twenty-five cents a gallon in the season, and sugar costs five cents a pound.

I wonder if you could not use this in order to get people off liquor and build up the intestinal mucosa. I can assure you of this; this apple wine will certainly help your mental attitude.

DR. F. C. RINKER, Norfolk: I thoroughly agree with the use of apple products as they are made and used particularly in children, as the pediatricians use them. But we have to think of the adult, and there are certain types of cases in which the apple is bad, and I do not think we ought to close this discussion without calling those cases to your attention. They are the cases of spastic colitis, of the spastic stomach, and of duodenal or gastric ulcer. In those individuals the apple—pure apple—is damaging. Apple products may be helpful, but I would warn you that we should not use the apple itself—the raw apple—in those particular cases in adult life.

DR. BAILEY, closing the discussion: I really think that possibly I should make a confession and take you back about a hundred and fifty years ago to an incident described in Dickens' "Tale of Two Cities." The author described some of his characters as getting stuck in the mud, and one of them said that It was a bad day and added that it was incumbent upon someone to say it. That is the chief reason why I presented this paper today, because it seemed incumbent upon someone to write such a paper.

I am in eye, ear, nose, and throat work. Of course, I am absolutely incapable of developing the general medical side or of reviewing any statement from the general medical side; I have to depend upon Dr. Pretlow for that. But I think in a generic sense the secret of the use of the apple as I use it in my work is to know something about the apple, know the vitamin content, and so forth. In the course of time we expect to have it standardized. This is a very green field and a very fertile field and it has not flowered yet.

In answering Dr. Hiden, as to apple wine for babies, I might say that he knows much more about that than I, so I shall not try to answer.

XUM

As to Dr. Rinker's remark, I do not think you should give any fruit or medicine to babies indiscriminately. We have to depend upon the general practitioner for that.

I want to thank you for permitting an eye, ear, nose, and throat man to appear before you on a general medical subject.

RUPTURED INTERVERTEBRAL DISK AND HYPERTROPHIED LIGAMENTUM FLAVA FOLLOW-UP STUDY.*

HOMER L. SKINNER, M.D., F.A.C.S.,
U. S. Marine Hospital,
Baltimore, Maryland.

This subject represents one of the causes of low back and sciatic pain. In adult life low back pain is one of the commonest complaints about which the orthopedic surgeon is consulted. It has almost unlimited possibilities of interpretation. It is a condition which annually accounts for the loss of much time from work, thereby resulting in a tremendous loss of man-power and a large economic burden.

A simple classification on a definite pathological or organic basis cannot be obtained but backache can be divided into two rather wide classes: (1) in which the pain is a symptom of some disease not definitely connected with the spine, and (2) in which it is in the spine itself. The treatment of the first group will fall to the internist, urologist, gynecologist or general abdominal surgeon. The treatment of the second group rightly falls in the field of the orthopedic or neurological surgeon. In examining

*Read before the Orthopedic Section of the Baltimore Medical Society, November 27, 1939.

Approved for publication in the *Virginia Medical Monthly* by the Surgeon General, U. S. Public Health Service, Washington, D. C., January 18, 1940.

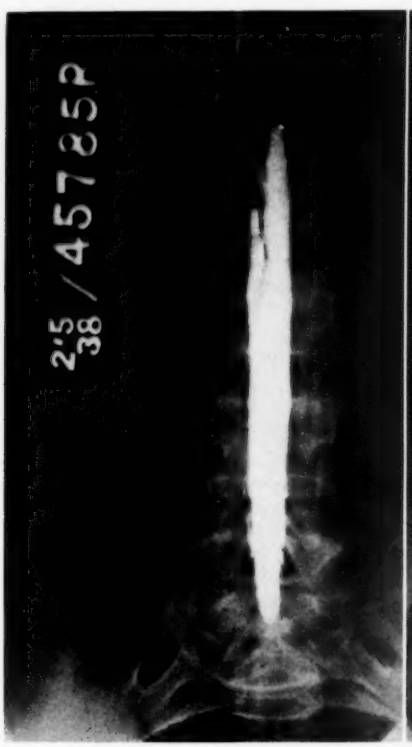


Fig. 1

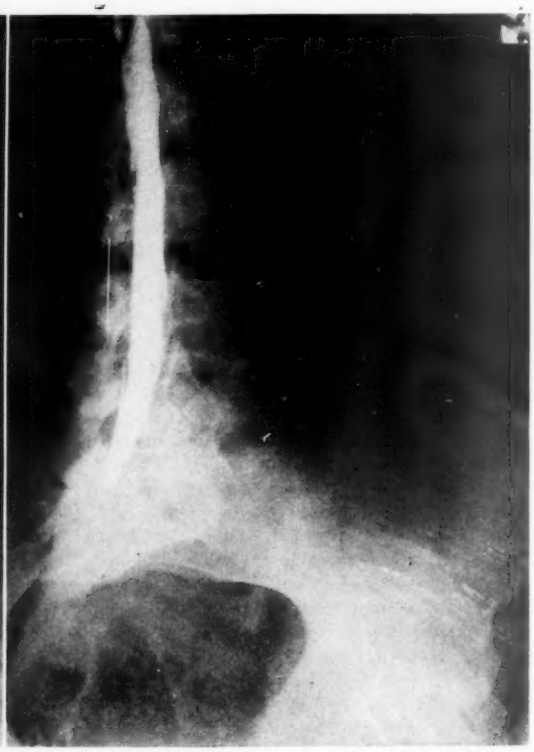


Fig. 1-A

these patients it is well to keep in mind that "sciatica," or sciatic pain, is a symptom and not a diagnosis of a disease entity and that any such complaint should impel the attending physician to search diligently for the causative factor in the production of the symptoms. Hypertrophic changes in the spinal column will result in low back pain and even sciatic pain but the mere presence of such changes as disclosed by the X-ray should not be accepted forthwith as the cause of the patient's symptoms. Hypertrophic changes, particularly in individuals of middle or advanced age, are not rare, and it is common to see extensive changes without symptoms referable to the back.

I will not make any attempt to review the literature on the various causes of low back pain, as you all are familiar with the various factors involved, nor will I review the literature on the subject at hand as no doubt you have all read the many recent articles. Leaving behind now these more or less general remarks, I should like to proceed to a short discussion of the symptoms and diagnosis of protruding intervertebral disks before presenting an analysis of our cases.

This condition has assumed a most important part in the diagnosis and treatment of painful conditions of the lower part of the back during the past few years. Protrusions may and do occur in the cervical and thoracic region of the spinal column but it appears that 90 per cent or more occur in the fourth and fifth disks.

The injury which causes a disk protrusion is not necessarily severe. The type of injury which results in the fracture of a vertebral body rarely produces a protrusion of that body's intervertebral disk. The common type of injury is when the patient attempts to lift a heavy object with his back bent forward or when he suddenly executes a forceful sitting position.

The onset of pain may be immediate and he may state that he heard a snapping sound. He may not be able to straighten from a stooped position or the symptoms may only be momentary to return in a few hours, days or weeks. If he does no further heavy work the pain may not return for months. As a rule, the patient is conscious of a "weak back" and guards himself carefully. In some cases symptoms are relieved after a few weeks' rest but are prone to be intermittent. The pain partakes of the characteristics of the root pain so commonly associated with tumors of the spinal cord—that is, it is exaggerated by coughing, sneezing and straining.

I will attempt to describe a typical case, a patient who presents himself for the diagnosis and treatment of intractable low back pain and sciatica with a history of mild trauma or strain to the back, scoliosis with the loss of normal lumbar lordosis, spasms of lumbar muscles, pain on straight leg raising, diminution or absence of Achilles' tendon reflex, increase in total protein content of cerebrospinal fluid and a narrowing of the intervertebral space along with subjective numbness on the outer side of thigh, calf of leg or foot, with exaggerated pain on straining efforts. With these findings a diagnosis of protruded intervertebral disk can be made with a high degree of accuracy. Unfortunately, the typical case is not the rule, as we do not always see the typical case of appendicitis.

Fig. 2

To confirm the diagnosis and to localize the lesion it is necessary to employ a contrast media in the spinal subarachnoid space during the fluoroscopic examination of the spinal column. Figure 1 and Figure 1-A represent the normal anterior posterior view and lateral view of the spinal canal following lipiodol injection. It will be noted in the anterior posterior view that the axillary folds and the nerve

roots show no depression or indentation. Figure 2 is an oblique view showing a typical defect in the axillary fold pressing the nerve root upward. Figure 3 represents what we feel is a defect from a hypertrophied ligament and it will be noted that there is no definite clear-cut indentation but rather a long depressed area between the lamina. Recently we have had a few cases of bilateral hypertrophied ligamentum flava showing hour glass constriction of the cord, which is represented in Figure 4.

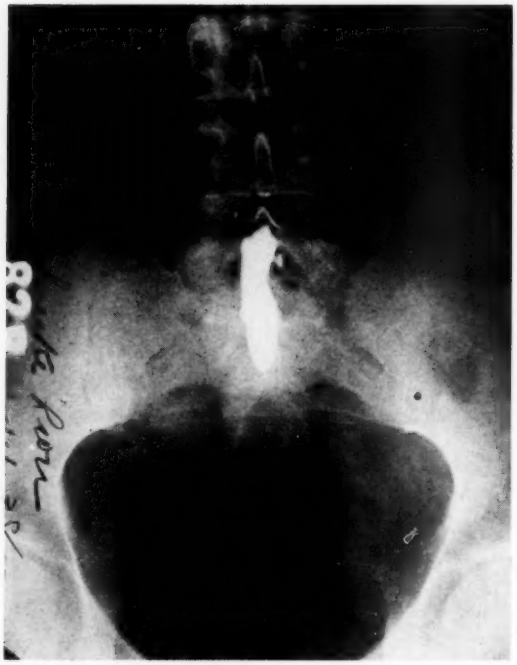


Fig. 3

Our series consists of twenty-eight operative cases. Twenty of these cases will be discussed tonight. The eight cases not being presented consist of two recently operated protruding disks, three cases of fusion of the spine, two of these showing narrowing of lumbosacral joint, the other a narrowed fourth intervertebral space; however, the two injected with contrast media showed no definite defect. Two of these cases have obtained a good result, the other has only been operated recently. The remaining three cases were ones with much more advanced findings than described here, two of them having paralysis, the lipiodol defect very indefinite, the operative findings showing only marked injection of cauda equina nerves. Many complicating factors were present in these cases and none of them were improved.

In presenting the twenty cases I will divide them into groups, according to the pathology found:

1. Thirteen cases of protruding intervertebral disk.
2. Four cases of hypertrophy of ligamentum flava.
3. Three cases of bilateral hypertrophy.

In the protruding disk cases there was usually associated some hypertrophy of the ligament; also in a few cases noticeable thickening of entire posterior ligament and annulus fibrosis along the intervertebral space. The involved nerve root was hyperemic. One case was re-operated and fusion of the spine performed.

In the hypertrophied ligament cases the involved nerve was hyperemic in one case. In one case there was associated varicosities of the veins which formed nests and on inspecting the nerve roots intradurally there was a suggested defect as from protruding disk. One of these cases was re-operated for recurring pain in the other extremity.

SUMMARY

The following is an analysis of the signs and symptoms of our cases:

PROTRUDING DISK CASES (THIRTEEN CASES)

Average Age thirty-nine years; oldest fifty-six years, youngest twenty years.

Average Duration of Symptoms three years, longest sixteen years, shortest two months.

Pain Aggravated on Straining Efforts nine cases, 69 per cent of cases.

Definite History of Injury three cases, 23 per cent of cases.

Pain Relieved in Change in Posture in All Cases two cases felt better in standing position. The others were relieved by rest except one case where pain was constant.

Symptoms Aggravated by Change in Weather three cases.

Pain Described as dull, aching in character in three cases; the others described pain as sharp, radiating in character.

Subjective Numbness eight cases, 60 per cent of cases.

Occupation—five seamen, one painter, one machinist, one longshoreman, one fireman, one truck driver, one chauffeur, one foreman, one iron worker.

Examination:

Loss of normal lumbar lordosis, spasm of erector spinae muscles, lowering of gluteal fold, positive straight leg raising test—ten cases, 77 per cent of cases.

Tenderness over nerve or sciatic notch—seven cases, 54 per cent of cases.

Circumference of thigh smaller—four cases, 30 per cent of cases.

Circumference of calf smaller—one case, 7.7 per cent of cases.

Diminished or absent Achilles' reflex—three cases, 23 per cent of cases.

Fig. 4

Lessened intervertebral space—one case, 8 per cent of cases.

Arthritis of spine—one case, 8 per cent of cases.

Lesion between fifth lumbar and sacrum—nine cases, 69 per cent of cases.

Lesion between fourth lumbar and fifth lumbar—four cases, 30 per cent of cases.

Reverse Queckenstedt test positive—five cases, 38 per cent of cases.

Total protein not elevated in any case.

HYPERTROPHIED LIGAMENTUM FLAVA (SEVEN CASES)

Average Age forty years; oldest sixty-one years, youngest twenty-four years.

Average Duration of Symptoms eight years; longest eleven years; shortest two years.

Pain Aggravated on Straining Efforts six cases, 86 per cent of cases.

Definite History of Injury five cases, seventy-one per cent of cases.

Symptoms Aggravated by Change of Weather four cases, 55 per cent of cases.

Subjective Numbness three cases, 43 per cent of cases.

Pain Described as dull, aching in lower spine with radiating.

Pain on Motion—Severe in bilateral cases.

Difference in Chief Complaint—These cases center complaint of pain in lower spine while protruding disk cases center complaint to pain in hip and leg.

Occupation—one chauffeur, one salesman, one painter, two laborers, two seamen.

Examination:

Straight lumbar spine, muscle spasm, positive straight leg raising test—four cases, 55 per cent of cases.

Tenderness over nerve—two cases, 28 per cent of cases.

Circumference of thigh smaller—two cases, 28 per cent of cases.

Circumference of calf smaller—one case, 14 per cent of cases.

Diminished or absent Achilles' reflex—three cases, 43 per cent of cases.

Lessened intervertebral space—one case, 14 per cent of cases.

Arthritis of spine—three cases, 43 per cent of cases.

Lesion between fifth lumbar and sacrum—two cases, 28 per cent of cases.

Lesion between fourth lumbar and fifth lumbar—six cases, 86 per cent of cases.

Reverse Queckenstedt test positive—five cases, 71 per cent of cases.

Total protein not elevated in any case.

FOLLOW-UP

Of the protruding intervertebral disks, ten cases (77 per cent) have been able to return to duty. One case still has pain at the end of the spine. Two

cases have occasional subjective numbness along the outer side of the foot. One case has had two recurrences of back pain following injuries. They have all been relieved of sciatic pain.

The period of observation has been eight months in four cases, eighteen to twenty-seven months in six cases. Of the three remaining cases two were only followed sixty days; the other case has never been able to return to duty. This case later had fusion of the spine without relief. Subjectively, he is totally disabled, but, objectively, he is rated as 25 per cent disabled. A large neurotic element has been a factor in this case before and after operation. Needless to say, he has not obtained any relief from his pain. Indirectly it was heard that one of the cases followed only sixty days was well and working but this was not confirmed.

Of the hypertrophied ligament cases, all four have been able to return to work but not heavy labor. They have more or less discomfort in their back after working, described as a tired weak feeling. One of these cases was re-operated for pain in the opposite leg with relief and later had recurrence of back pain in the thoracic region. These cases have been checked from twenty to twenty-four months.

The cases of bilateral hypertrophied ligament with hour glass constriction: One has been followed for a year and is working daily. He states he has slight discomfort in the lower back at times but it is so mild compared to before the operation that he considers himself well. One case has not been checked. About eight months after the operation we heard from another patient that he was well and working but this could not be confirmed. One case was relieved for a year and suffered recurrence of back pain following an injury. Correspondence with one of our hospitals states that his symptoms are not severe and an early recovery is anticipated.

In conclusion, one can see that this does not offer 100 per cent complete relief; however, it does offer a good chance of relief from sciatic pain or radiating pain to the buttocks, only failing in one case out of the twenty present. It is my opinion that these cases should not continue doing heavy labor or engage in dangerous occupations where they are likely to suffer an injury to their back. It is also my feeling that these patients have a weak back to start with and they still have it following the operation. The cases of hypertrophied ligamentum flava admit it and I sometimes feel that the cases of protruding intervertebral disk are a little hesitant to tell you that their backs are weak because they are so grateful for relief of their severe sciatic pain. This brings up the question, should these backs be fused, and, if so, which ones?

I feel that the cases should be fused that show congenital weakness, narrowing of the intervertebral space, slipping of the articulating facets with unusual mobility of the vertebrae. I also feel that our follow-up on these cases should be more careful, especially in regard to the type of exercise they should take, their posture should be watched and they should not return to heavy manual labor within a sixty-day period as we have allowed them to do heretofore.

REFERENCES

Skinner, Homer L., and Rountree, James T.: Herniation of the Intervertebral Disk and Associated Lesions—With Report of Cases. *Virginia Medical Monthly*, Vol. 66, October, 1939.

SULFAPYRIDINE—USES AND REPORT OF CASES.*

R. HENRY TEMPLE, M. D.,
Kinston, North Carolina.

The introduction of any new method of treatment or specific form of therapy has always been accepted with a considerable feeling of doubt by the medical profession until sufficient time has elapsed to prove its real worth. This, however, has not been entirely true in the instance of sulfapyridine. The outstanding results obtained from the start convinced the medical profession of its merit.

Since May, 1938,[1] a series of articles has appeared in the medical literature, presenting conclusive evidence of the value of sulfapyridine, also known as M. & B. 693, and as Dagenen. Drs. Evans and Gaisford[2] were the first to use the drug in the treatment of disease in humans. They treated 200 cases

*Read as part of a Symposium on Sulfapyridine before the Seaboard Medical Association of Virginia and North Carolina, at Virginia Beach, Va., December 12-14, 1939.

of pneumonia with excellent results. Encouraging results were also noted by Waller[3] in thirty-nine cases of lobar pneumonia, but mention was made of cases which were resistant to sulfapyridine.

The clinical pharmacology of sulfapyridine (which is a white, crystalline powder, practically odorless and tasteless) when administered orally shows it to be absorbed fairly rapidly from the gastro-intestinal tract, although not in such constant amounts as sulfanilamide.[4] Within a short time after administration sulfapyridine may be detected in the blood by means of a test in which it is transformed into a colored dye substance, and then compared with known standards in a colorimeter. The method used by my technician, who did all tests including hospital cases, is the procedure by Marshall and Litchfield.[5] The method is appended† to this paper. All chemicals and solutions were supplied by Van Pelt and Brown, of Richmond, Virginia. The method can also be applied to sulfanilamide free and conjugated. Acetylation of the drug occurs and many observers feel that the hematuria that sometimes occurs when the drug is given is due to the stone formation in the kidney pelvis and parenchyma of the acetylated compound, and not due to acute nephritis.[6] The blood concentration of free sulfapyridine following oral administration of a given dose cannot be predicted with the same accuracy as is possible with sulfanilamide. With average effective therapeutic doses the blood levels of free sulfapyridine in the following reported cases are between three to ten milligrams per 100 cc. of blood. In general, it is found that sulfapyridine levels are lower than sulfanilamide in the blood with the same dosage.[7] In the series reported, negroes seemed to run three to four milligrams higher blood concentration than whites on the same dosage.

The toxic reactions encountered with sulfapyridine, as compared with sulfanilamide, are sufficient to require careful dosage of the drug and close observation of the patient. Nausea and vomiting are the most constant and frequent side-effects. No serious constitutional effects have been reported as a result of this untoward reaction, aside from the obvious loss of body fluids and salts. Very few gastro-intestinal upsets were seen in this series of 107 cases reported in this paper. Cyanosis was noted in practically all cases in the series; it was somewhat alarming in the first few cases; if in doubt as to cause of cyanosis, as in cases of pneumonia, oxygen is used routinely. In other diseases, cyanosis alone as a toxic symptom should be disregarded—vertigo, headache, malaise, mental depression, and occasionally excitement severe enough to be classed as a toxic psychosis is encountered. These symptoms respond immediately to a reduced dosage or discontinuance of the drug. Severe toxic effects of utmost importance include acute hemolytic anemia and neutropenia. Unless daily blood counts and hemoglobin determinations are made these serious reactions may not be detected. However, in the reported cases a practice was made of doing a leucocyte count, differential count, and hemoglobin determination twice weekly where patients manifested any toxic signs or symptoms. The literature cautions against toxic hepatitis, anuria with uremia, and various blood dyscrasias that require immediate transfusion of blood.

Most of the cases in private practice cannot afford the laboratory work that is desired for a complete study. However, a point was made to take a quantitative sulfapyridine blood concentration at the end of the third or fourth day before reducing the drug to a maintenance dose; also a complete urinalysis. The patients reported were all seen at least every other day, and many, much more often. To date no difficulties have arisen from any severe toxic effects while using sulfapyridine; nevertheless, it is recommended that the following diagnostic procedures be employed in cases receiving sulfapyridine.[8]

First: Before starting treatment, make a complete blood count and urinalysis.

Second: In cases of pneumonia the sputum should be typed, as the use of serum is often advisable in late cases or in cases where response to Sulfapyridine is negligible in the first thirty-six hours. Also blood culture should be taken where possible before sulfapyridine therapy is instituted, as later cultures may be worthless because of the drugs bacterio-static effect.

There are no hard and fast rules with regard to the amount of the drug administered. However, it is important, first, that the drug be administered early in the disease; secondly, that a relatively large amount of the drug be administered in the first dose; and, thirdly, that a satisfactory maintenance dose be given. The following schedule was used in all adult patients in the cases to be reported: An initial dose of two grams was given, followed by one gram every four hours, day and night, in severe cases of pneumonia and hospitalized patients, until results were

obtained, regardless of the disease treated; of course, in the less serious cases the patient was not disturbed at night. Blood level determinations are the best index for dosage and should range between three to seven milligrams per cent, but in many instances clinical response has to be relied upon to serve as a guide in dosage. Infants and children require a proportionately smaller dosage.[9] More recent reports seem to indicate that repeated small doses at two hour intervals lessen the nausea and vomiting in nearly all patients who have shown this reaction with larger doses at less frequent intervals.

REPORT OF CASES

Fourteen cases of whooping cough were treated with sulfapyridine; with fourteen control cases treated with gold tribromate and pertussis antigen. Sedation and symptomatic treatment were given in both groups. The sulfapyridine group had no complications, the duration of illness was shortened from one to two weeks, there was no increase in vomiting, and the cough was much diminished. An excellent opportunity for study was given in a family of six, including the mother and father; the children ranged from ages six months to nine years. The infant was given sulfapyridine, and the ages were alternated as to treatment. The response was gratifying in the sulfapyridine group, so much so that, after half the family were well in a little over two weeks, a demand was made for sulfapyridine treatment in the other three.

Thirty-one cases of gonorrhea were treated with sulfapyridine with almost dramatic results. The toxicity of the drug was not nearly so marked as sulfanilamide used in previous cases. Usually the discharge cleared in from five to ten days, though four cases required two weeks. Two cases did not respond to sulfapyridine treatment, and one of these cases is still under treatment with an epididymitis. The criteria for cure in this series of cases is the absence of organisms or leucocytes in a centrifuged specimen of urine voided after a night's rest, and a prostatic smear showing no organisms and less than ten leucocytes per high powered field three weeks after sulfapyridine had been discontinued. The dosage of sulfapyridine is the same as the daily dosage previously mentioned, but the total amount is much higher as the time required in treatment is longer than most other diseases. The initial dosage of two grams, followed by one gram every four hours while patient is not asleep, is kept up until the discharge has disappeared. The dose is cut in half for ten days, then discontinued. The case previously mentioned as still under treatment has had a tremendous amount of the drug, a total of 150 grams being ingested during treatment. I believe now it is wise to discontinue the drug if discharge has not cleared after two weeks of treatment. None of the thirty-one cases had any toxic effects other than nausea and vomiting. The patient that had 150 grams of sulfapyridine showed a low grade anemia with a color index of 0.68. With this limited experience, it seems that sulfapyridine is much more effective than sulfanilamide in the treatment of gonorrhea. I have only read one report on the use of sulfapyridine in gonorrhea, and wonder if other physicians are finding it as successful in treating gonorrhea.[10]

Five cases of lobar pneumonia in adults were also treated with sulfapyridine alone, and two cases with the drug plus specific serum.

Case 1. L. B., a twenty-four-year-old negro man, was seen on the fifth day of an acute illness. He gave a past history of luetic infection six years ago with inadequate treatment. Sputum typed and showed Type V pneumococci infection. The physical examination revealed pneumonia involving right lower and middle lobes and left lower lobe. Sulfapyridine was started within six hours. On the second and third day after medication, which were the seventh and eighth day of the illness, he was afebrile. An uneventful recovery was made with no complications and no toxic reactions to sulfapyridine.

Case 2. J. K., a forty-eight-year-old negro man, was seen on the third day of the disease. Sputum showed Type I organisms. Blood culture and Wassermann were both positive. Physical examination revealed consolidation of the lower right lobe. Patient was extremely toxic and restless, with a temperature of 106.4° Farenheit. An aortic murmur, both systolic and diastolic, was noted with the apex beat fifteen centimeters from the mid-sternal line. Sulfapyridine in usual dosage was started along with digitalis in doses of four and one-half grains daily. Patient became afebrile on the seventh day of the disease, which was the fourth day after medication was started; in twenty-four hours the fever dropped from the high level of 106.4° Farenheit down to 102.6° Farenheit. The drug, through a mistake of the attendant, was discontinued on the fifth day of medication, with a recrudescence of the

illness. The drug was then continued until sixty-eight grams were given. Anti-luetic treatment was given during convalescence and continued for four months, when patient suffered an attack of coronary occlusion and immediate death.

Case 3. A. S., a white woman twenty-eight years old, was seen on the third day of illness with pneumonia involving entire left lower lobe. When seen, the sputum showed Type XVIII pneumococci. Blood culture was sterile and White Blood Cells 18,200. Sulfapyridine was started and continued until thirty grams were administered. There was a quick response to the drug and no reactions occurred.

Case 4. A forty-two-year-old white woman was seen the day following an acute onset. The sputum showed Type III organisms, and blood culture was negative. The white cells were 16,200. Sulfapyridine was started promptly and because of an extensive pulmonary involvement was continued until seventy-five grams had been administered. Although the temperature did not drop until the tenth day, the severe toxemia was quickly controlled. The temperature did not become normal until the drug was cut to two grams daily. There was no gastro-intestinal disturbance, or any evidence of agranulocytosis. Cyanosis did persist to a marked degree throughout intake of the drug.

Case 5. A thirty-four-year-old white man was admitted to the hospital on the third day of illness. Physical examination and X-ray revealed involvement of the left upper lobe; the sputum showed Type II pneumococci; blood culture was negative, and the leucocyte count was 22,000. Sulfapyridine was given until fifty grams were taken, with quick and positive response in twenty-four hours, and patient was afebrile in forty-eight hours. No toxic manifestations were noted.

Case 6. W. C. W., a white man fifty-seven years of age, was seen on the third day of illness. He was immediately hospitalized. X-ray and physical examination showed extensive involvement of both lung fields. Sputum was typed and revealed Type II pneumococci. Patient was desperately ill, very restless, comatose; Kernig and Babinski signs were positive.* Spinal tap was performed and a purulent fluid which also showed Type II pneumococci was obtained. Urinalysis showed urine packed with pneumococci. Culture of sediment positive for Type II pneumococci. Sulfapyridine was started immediately after admission, and 10,000 units of specific serum given intravenously every four hours. Patient died on sixth day of illness after having received 80,000 units of specific serum and twenty grams of sulfapyridine. A blood determination showed a very low concentration of sulfapyridine in this case—only three miligrams per cent. Since this case a report by Hodes, Gimbel, and Burnett, of Baltimore,[11] on the treatment of pneumococci meningitis has shown that the blood level can be raised in such cases by giving 70 cc. of 5 per cent solution of sodium sulfapyridine[12] intravenously daily along with oral medication. I have not had the opportunity of trying this method, but it seems a valuable procedure in gastro-intestinal toxemia and comatose patients.

Case 7. To me, this case alone seems to give evidence that we now have available therapeutic agents more effective in treatment of pneumonia than any previously used. This fifty-nine-year-old white man, D. W., was admitted to hospital on the fifth day of a very acute illness. The sputum showed Type III pneumococci and the blood contained thirty Type III organisms per cubic centimeter. The leucocyte count was only 5,250. Sulfapyridine was started as soon as clinical diagnosis of pneumonia was made, followed in four hours by the intravenous injection of 100,000 units of rabbit serum, and twelve hours later another 100,000 units of additional serum intravenously. The toxemia and septicemia were quickly controlled. The leucocyte count rose to 13,500 during the period sulfapyridine was used, and due to the grave prognosis seventy-five grams of the drug was given. The only toxic manifestation was hiccups of four days duration.

In forty-two cases of mixed broncho-pneumonia and acute bronchitis in children—all under five years of age, with temperatures ranging from 102° Farenheit to 105.6° Farenheit—the results were more spectacular than in any other disease treated with sulfapyridine. The dosage here is important as it is difficult to determine the concentration of the drug. These were the only cases in which blood concentration was not determined. A dosage schedule was carried out as follows:

For children under six months, one-fourth of a 0.5 gram tablet, crushed and made into individual papers with five grains of sodium bicarbonate, to be given every four hours day and night.

Children from six months to one year were given one-half of a 0.5 gram tablet with soda. From one to two years, one 0.5 gram tablet every six hours day

and night. From two to six years, one 0.5 gram tablet every four hours, followed by a soda mint tablet.

Physicians all know that most children have nature on their side; however, the way the upper respiratory infections, including laryngitis, laryngotracheitis, and pharyngitis clear up in two to three days on sulfapyridine medication is remarkable when in winters before this past one the infants and small children responded so very slowly to symptomatic treatment alone. I will admit these patients were studied very poorly as to the laboratory work and a definite diagnosis. Included in these cases were complications consisting of otitis media, rhinitis, and tonsillitis. The multiple prescriptions for symptomatic treatment were prescribed for all. Probably very few lives were saved out of this series of cases, but the monetary reward was large, as many parents commented on how quickly the children recovered when, in seasons before, the illness continued for weeks on end, and, best of all, not a single myringotomy was performed on any of the cases, while in the winters before bulging ear drums were extremely common.

Two cases of typhus fever were treated with sulfapyridine with moderate success:

Case 1. White male, aged thirty-nine, acute onset of two days duration. Toxic, temperature 104° Farenheit, pulse 124, respiration thirty, and two chills daily with drenching sweats. A diagnosis of malaria was made, but no improvement in three days on Atabrine and quinine necessitated a blood serum agglutination. Regular dosage of sulfapyridine was given immediately after discontinuing malaria treatment. In five days the patient was afebrile and the dosage was reduced to half. An uneventful recovery was made.

Case 2. B. R., white male, aged twenty-eight, acute onset of four days duration. Malaise of two weeks duration. Very toxic, temperature 105° Farenheit, pulse 130, respiration twenty-four, two to three chills daily with three to four drenching sweats. Malaria diagnosed and treated for four days. Agglutination tests positive for typhus in dilution of one to 320 complete, and partial one to 640. Agglutination tests made one month later showed still stronger agglutination complete in one to 640 and partial one to 1,280. Quite a severe hematuria developed eight days after sulfapyridine was given, which cleared up in five days after the medication was stopped. The patient had a stormy course, but made a complete recovery.

One case of undulant fever was treated with sulfapyridine:

C. H., white male, thirty-one years of age. Illness of six weeks duration. Complicated by biliary cirrhosis, nephritis and chronic alcoholism. Serum, 300 cc. citrated blood, given daily, as also regular sulfapyridine dosage. The patient seemed to improve and became afebrile in five days after treatment began. Then, two days following, he had chill, hematuria, aneuria and uremia set in and patient died in twenty-four hours.

Nine cases of pyelitis with various etiology were treated with sulfapyridine. Centrifuged specimens of urine with sediment stained by Gram's method were performed on each case. Bacillus coli accounted for four, four were Gram positive staphylococcus, and one a mixed infection. No cultures were done. Fifty grams of sulfapyridine were given each case, following regular dosage schedule, with all cases showing complete clearing in ten days. No urological studies or X-ray examinations were done on any of these cases.

One case of subacute bacterial endocarditis was treated with sulfapyridine:

L. W., a negro female, age nineteen. Onset four months ago. Bedridden since onset. Had a positive Wassermann. Was given 100 grams of sulfapyridine following 500 grains of sulfanilamide. Patient became afebrile in ten days after treatment began. Little laboratory work was done except for three blood cultures which were returned positive for streptococcus viridans. Patient still under treatment for luetic infection. Mitral systolic murmur persists and more than likely the improvement is a remission that often occurs in bacterial endocarditis.

Certainly, the results with sulfapyridine in the treatment of the above reported cases seems in most instances gratifying. However, such a small heterogeneous series of cases without control cases is hard to evaluate properly. But it does seem that sulfapyridine and its related compounds will take their place in chemotherapy. Only time will tell if these new chemicals will be able to maintain their position in the treatment of disease.

The sulfapyridine, pneumonia antitoxins, and pertussis antigen used were all manufactured by Lederle Laboratories, Incorporated, of New York.

APPENDIX

PROCEDURE FOR SULFAPYRIDINE DETERMINATION†

REAGENTS:

(1) A solution of trichloroacetic acid containing 15 gm. dissolved in water and diluted to 100 cc.

(2) A 0.1 per cent solution of sodium nitrite.

(3) A solution of dimethyl-a-naphthylamine containing 1 cc. in 250 cc. of 95 per cent alcohol. This solution should be kept in a dark colored bottle.

(4) A solution of saponin containing 0.5 gm. per liter.

(5) 4 N hydrochloric acid.

(6) A 1 M phosphate buffer containing sulfamate. Sodium dihydrogen phosphate ($NaH_2PO_4H_2O$) 13.8 gm., ammonium sulfamate 0.5 gm., water 100 cc.

(7) A 2 M phosphate buffer containing sulfamate. Sodium dihydrogen phosphate 27.6 gm., ammonium sulfamate 0.5 gm., water 100 cc.

(8) A stock aqueous solution of sulfanilamide containing 200 mg. per liter. Standard solutions of various strengths are readily prepared from this. Three standards are suggested—1, 0.5 and 0.2 mg. per cent.

Numbers 6 and 7 are not necessary unless you desire to determine the total amount of sulfanilamide, which means both free and conjugated forms. Numbers 1, 2, 3, 4, 6, and 8 are the ones necessary for determining free sulfanilamide.

To prepare standard solution containing trichloroacetic acid solution for use in the blood method, 5, 2.5 and 1 cc. of the stock solution plus 18 cc. of trichloroacetic acid are diluted to 100 cc.

Two cc. of oxalated blood are measured into a flask and diluted with 30 cc. of saponin solution. After complete laking (2 minutes), add with continuous shaking 8 cc. of the trichloroacetic acid solution. Allow to stand for 5 minutes. Filter. Measure 10 cc. of filtrate into a small flask or test tube. Add 1 cc. of freshly prepared sodium nitrite solution and shake. After standing 3 minutes, add 1 cc. of 1N solution of sodium dihydrogen phosphate containing 0.5 per cent of ammonium sulfamate. After standing 2 minutes, add 5 cc. of the alcoholic solution of dimethyl-alpha-naphthyamine. Allow to stand for 10 minutes, during which time the color develops. Make colorimetric determination. Ten cc. of diluted standard treated likewise for comparison.

To determine the total sulfanilamide, free plus conjugated, place 10 cc. of blood filtrate in a 15x150-mm. test tube, graduated at 10 cc., add 0.5 cc. of 4N hydrochloric acid and heat in a boiling water bath for 60 minutes, cool, add water to 10 cc., and follow the same procedure as in determining free sulfanilamide except that in place of the 1 M buffer containing sulfamate, a 2 M buffer-sulfamate is used. The difference between the values obtained before and after hydrolysis gives us the amount of conjugated material, calculated as sulfanilamide. With blood levels above 5 mg. per cent, a correction of ten per cent should be added when a 1:20 dilution is employed. With values below 5 mg. per cent no correction is needed.

CALCULATIONS:

$$\frac{\text{Reading Standard}}{\text{Reading unknown}} \times 0.1 \times \frac{100}{.5} \times 1.25 = \text{mg. sulfapyridine per 100 cc.}$$

The factor 1.25 allows for the lower color value (0.8) of sulfapyridine per mg. as compared to sulfanilamide in the standard.

Sulfanilamide is the more convenient standard because it is more stable. This factor may vary slightly with different preparations of the drug and should be determined in each laboratory from the average of several comparisons of sulfanilamide and sulfapyridine.

BIBLIOGRAPHY

1. Whitley, L. E. H.: *Lancet* 1, 1210, May 28, 1938.
2. Evans, G. M., and Gaisford, W. F.: *Lancet* II, 14-19, July 2, 1938.
3. Waller, W. K.: Bulletin School of Medicine, University of Maryland, Volume 24, No. 2, October, 1939.
4. Long, P. H., and Fienstone, W. H.: Proc. Soc. Exper. Biol. and Med., 39:486-491, December, 1938.
5. *Science*, 88:85, July 22, 1938.
6. *Jour. A. M. A.*, 113:18, 1614-1619, October 28, 1939.
7. Barnett, H. L., Hartman, Perley, and Ruboff, *Jour. A. M. A.*, 112:518-527, February 11, 1939.
8. Flippin, H. F., Lockwood, J. S., Pepper, D. S., and Schwartz: *Jour. A. M. A.*, 112:529-534, February 11, 1939.
9. Smith, C. H., Nemir, R. L.: *Jour. A. M. A.*, 113:21, 1857-1860, November 18, 1939.
10. *Archives of Internal Medicine*, November, 1939.
11. Hodes, H. L., Gimbel, H. S., and Burnett, G. W.: *Jour. A. M. A.*, 113:18, October 28, 1939.
12. Marshall, E. K., Jr., Bratton, A. C., and Litchfield, J. T., Jr.: *Science*, 88: 597-599, December 23, 1938.

306½ North Queen Street.

TUBERCULOSIS, A REVIEW AND LOCAL STUDY—
A Five-Year Study of Clinic Patients in a City of 34,500 Population.*

THOMAS N. HUNNICUTT, JR., M.D., Associate A.C.P.,
Newport News, Virginia.

Tuberculosis, a disease which has been recognized, treated, and studied since the time of Hippocrates, in the 4th Century B. C., still remains one of the greatest health and economic problems of today. For this disease is still the chief cause of death in the so-called prime of life, or the ages between fifteen and forty-five. Its treatment, in spite of modern methods, is a long drawn-out process which vitally disturbs the economic status of not only the person affected but usually of the whole family group. In fact, it is because of this economic strain that the states have practically taken over the care of patients with tuberculosis. The tuberculosis sanitoria are some of our finest institutions, but there are certainly too few of them.

The old name—consumption—was a descriptive term of what had happened to a patient with the disease and the diagnosis was made usually too late to aid the person so affected. It was Sylvius (F. de le Boe) who first, in the seventeenth (17th) century gave us the correlation between tubercles found in the lung, and the disease. This contribution was followed by Laennec's invention of the stethoscope which was the first aid to early diagnosis. But it was not until Villemin in 1865 proved that the disease could be inoculated, and seventeen (17) years later when Koch discovered the tubercle bacillus, that any real progress was made. Yet, today, how many patients are diagnosed literally as consumptives because they have been just about consumed by tuberculosis before they are diagnosed or any treatment whatsoever is begun!

During the past decade a wealth of papers on tuberculosis has been published. The knowledge gleaned from these is well worth summarizing because these various studies have brought to light many interesting and important facts which, if applied, will lead to the eventual eradication of this disease. There is still a difference of opinion among the men who devote all their energies to the treatment of tuberculosis, but when analyzed these differences are usually not significant or important.

We now know that tuberculosis is caused by the tubercle bacillus and not by bad air, poor food, inadequate shelter, or just being "run down", nor is it inherited. The bacillus gets into the body through the mouth or nose and its first effect is on the neutrophils. These take up the bacilli but are destroyed by its polysaccharide toxin. The monocytes then come to the rescue and ingest the dead neutrophils along with the tubercle bacilli contained in them. The bacilli are not toxic to the monocytes, but they cause these cells to be converted into epithelial-like cells. Myers[1] states that the phosphatide content of the tubercle bacillus is responsible for this. The bacilli may die here, but many live and multiply. The lymphocytes are next attracted to the site of this early forming tubercle, and, quoting from Myers' paper: "The waxes of the tubercle bacilli stimulate the proliferation of fibroblasts while their acetone-soluble fats cause an increase in all local connective tissue cells. This results in the laying down of fibrous tissue around the periphery of the tubercle."

The tubercle thus formed may be located in any portion of the lungs, but it is usually in the mid or upper sections of the lungs. Miller[2] states in his outstanding monograph that tubercles are found most often in the regions of the final divisions of the bronchial tree. It is in this region that the bronchial artery terminates as a nutrient vessel and the pulmonary artery takes over. This is regarded as significant and probably due to a retardation of the circulatory force at this point. The value of this observation has not been proven as yet, but it may throw further light on the final clue to many unanswered questions concerning resistance to tuberculosis.

From the above it is seen that the first victory over tuberculosis is won fairly easily by the body, for during this period there is no appreciable damage to the well-being of the individual. However, many bacilli remain alive in the tubercle and it is stated by Sweany[3] that these fibrous capsules and

*Read before the forty-fourth annual meeting of the Seaboard Medical Association of Virginia and North Carolina, at Virginia Beach, Va., December 12-14, 1939. This paper was also read before the Warwick County Medical Society, November, 1939.

even those with lime salts in them may break down at any time, setting free viable tubercle bacilli.

Up to now it is not possible to diagnose the disease as such and individuals harboring these first tubercles are unaware of any symptoms, for there are none; neither are signs appreciable. However, the protein of the killed bacilli causes a sensitization of the body tissues in about six (6) weeks. It is this sensitization to the tuberculoprotein which gives us the first diagnostic test, the tuberculin test. This important discovery by Von Pirquet fell into relative disrepute because "too many reactors were found." Little significance was placed on the fact that children over twelve years of age were positive because it was held that most of the population became infected (sensitive to tuberculoprotein) at this age or certainly before reaching maturity. Now, however, this criticism cannot be made, for many studies give incidences as low as 10 per cent;[4] and, frequently less than 30 per cent positive reactors are found in large series of high school students. "In the State of Minnesota actual observation has shown that in only approximately one per cent (1%) of children and young adults do tuberculins become positive each year." There are still centers of population, as in New York, Philadelphia, and Baltimore as well as on the lower peninsula, where the incidence of positive tuberculins remains very high, too high.

It is now known that the tuberculin test will screen out all unsuspected cases of tuberculosis and will after a latent period of at most seven (7) weeks[5] pick up practically all persons who have become infected with tubercle bacilli. This is very important for the pathology and invasion of the bacillus is entirely different when once the tissues become sensitized to tuberculoprotein. Before this sensitization takes place, as pointed out above, infection never results in illness or clinical tuberculosis because the body takes care of it, but in the effort something is lost and that probably is the cause of the destructive lesions in reinfection or adult tuberculosis, namely, sensitivity. The first infection or primary tuberculosis never requires treatment and apparently always heals. An illustration often used in talking to lay audiences is that of two pieces of cloth, one dampened with water, the other with oil, and comparing the result of dropping a lighted match on each. The first may be scorched where the match lands, but it will not burn (compared to fibrotic tubercles in the lung parenchyma, calcified nodes, enlarged hilum glands, and the tracheobronchial adenopathy of primary tuberculosis). The second, however, stands a good chance of being burned and destroyed (compared to reinfection or adult tuberculosis with infiltration, frequently out of proportion to invasion, tissue destruction, caseation, and cavitation).

In summarizing a conception of pulmonary tuberculosis infection, it is important to define the types now recognized. The term childhood tuberculosis has been discarded and replaced by the term primary tuberculosis. By this term one means all of the morbid processes following the first invasion of the tubercle bacilli up to, and including, the development of sensitivity to tuberculoprotein and the healing of the first lesions. Soper[6] and others have pointed out that primary tuberculosis also occurs frequently in adults and that the reaction and course is the same as in children.

Clinical tuberculosis or adult tuberculosis is classified as reinfection tuberculosis because the disease we commonly speak of as pulmonary tuberculosis is always due to reinfection. This may be accomplished in one of two ways—exogenous (bacilli inhaled from the outside) or endogenous (by a breaking down of the primary lesions and the freeing of viable bacilli).

Once established, reinfection tuberculosis usually occurs as a small infiltration at or near the apex of the lungs. The symptoms are those of a mild cold, plus anorexia, loss of weight, and fatigue. Signs may be absent but usually a few rales can be heard in a very restricted area, after an expiratory cough. There is no sputum until the lesion ulcerates. The X-ray findings are missed unless the films are light and sharp; usually only a small softly-mottled area one to two centimeters in diameter is found. This type of case is classified as minimal tuberculosis and the lesion at this point may absorb, fibrosis encircle it, and complete healing take place. On the other hand, the lesion may progress slowly or rapidly with caseation, liquefaction and excavation.

It is very important to ascertain in these minimal lesions whether they are fibroid and productive (healing) or if they are inflammatory and exudative (progressing). This often requires serial films. The progressive lesions soon cause to develop more profound symptoms and an increase in bronchial

discharges (indicative of necrosis and ulceration into a bronchus and the beginning of cavity formation). Hemoptysis and the findings of bacilli in the sputum are always indicative of cavities. The absence of these symptoms, though, does not rule out cavities. Of course, the finding of cavities by films is of unquestionable value and when they are found no larger than 4 cm. in diameter in only one lobe, the case is classified as moderately advanced. With the further progression of the disease and the spread to other areas of the lung the cases are classified as far advanced.

As can be seen from the above, "excavation is the beginning of progressive pulmonary tuberculosis and the prevention or closure of the cavity is the most important single feature of clinical recovery. Otherwise, contamination of other parts of the lung eventually is inevitable."[7]

The usual course of tuberculosis is that of progression caused by the breaking down of the walls of tubercles and contamination of adjacent fresh areas in the lung; this is called bronchogenic spread. Occasionally there will occur a hematogenous spread which usually results in a rapidly fatal miliary tuberculosis or the involvement of other organs. This type of disease is not common; apparently it is due to one of two factors: (1) that of a total lack of resistance, and (2) that of the unfortunate circumstance when a large number of tubercle bacilli are evacuated directly into a large blood vessel by the ulceration of a tubercle.

The complete story of healing or resistance in tuberculosis is not known, but it is a fact that progression takes place most often in young adults, adolescent girls, at the termination of a pregnancy, and under poor environmental conditions. The observation that negroes are more susceptible to tuberculosis is not borne out by studies when whites and blacks are compared under the same living and economic conditions. Also, many have questioned the premise of constitutional predisposition; they state with rationale that the general debility seen frequently before the "breakdown" might be due to the early influence of tuberculotoxins. It is well known that certain people under unfavorable conditions do not necessarily have more tuberculosis than others, namely, the Jews in Europe; in fact, they have a great deal less.[8]

From the foregoing review it can be seen that the present-day conception of tuberculosis is very clear. Of course, there are still unanswered questions which make the story as yet incomplete, but with this picture as a background, it was decided to analyze the findings in a recent period at the local tuberculosis clinic.

During the past five (5) years it has been my privilege to be associated with the Newport News Tuberculosis Association as their clinician. This organization is unique in the fact that it was and still is fostered by several local public-spirited women and not by the State. They depend on their income from the sale of seals and occasional gifts. This is not a part-pay clinic, for no funds are solicited or accepted from patients. In the period from 1934 to 1939, 4,382 examinations were made, which included physicals restricted to the chest, tuberculins, fluoroscopics, and pneumothorax refills. Most of the patients seen in the regular monthly clinics were recruited among known contacts by the visiting nurses, Health Department, and city physician. Local physicians referred the next largest group, and others came in either as a result of early diagnosis campaigns in the schools and civic clubs or on the recommendation of old patients. Except for indigents, only patients referred by physicians were accepted and a report was always sent to the family or referring doctor. Therefore, the majority of the patients had a poor economic status with its attendant inadequate and low standard living conditions.

In 1934 it was decided to do more tuberculin testing in order to have under observation those persons most likely to develop the disease, and in this way these cases might be diagnosed earlier and treatment started before they were far advanced. Also, the question of tracking down open cases could be solved in part by finding unsuspected reactors among unknown contacts.

It has been demonstrated that tuberculin testing is the most efficient method as well as the least costly for detecting tuberculosis in large groups.[9] Concerning X-ray surveys, it has been shown that "they are expensive, may confuse non-specific infections, and certainly in children the disease is so rare in communicable form as to make them unjustified. The money spent in these surveys was necessary, but with the above fact determined, it now seems a waste of funds."

The purified protein derivative[10] has been used rather than old tuberculin, because in several

comparative studies P.P.D. was found to pick up more reactors, give more uniform results, and produce fewer four plus reactions (vesiculation and necrosis) than the old tuberculin. This test is made in tablets of two (2) strengths, the first being 0.0002 mgs., and the second 0.05 mgs. These two strengths, when diluted, compare respectively with the 0.1 mg. and 1. mg. strengths of old tuberculin.

The majority of the tests were done on contacts of the clinic patients and every effort was made to test all known contacts of open cases, especially those under twelve years of age.

Table No. 1 shows the results of 954 tuberculins done in the past five years. Actually only 897 were read due to the fact that some did not return in forty-eight hours. You will note that in the contacts the percentage of positive reactors is about the same, both in the younger as well as the older group.

TABLE 1

ALL TUBERCULINS 1934 TO 1939

Total tested..... 954
Tests read..... 897

6 months to 15 years —306— Pos. 44% Neg. 56%				*15 years to 22 years* —591— Pos. 40% Neg. 60%			
CONTACTS		NO KNOWN CONTACTS		CONTACTS		NO KNOWN CONTACTS	
173		133		111		480	
56%		44%		19%		81%	
Pos.	*Neg.*	*Pos.*	*Neg.*	*Pos.*	*Neg.*	*Pos.*	*Neg.*
110	63	24	109	69	42	170	310
63%	37%	18%	82%	62%	38%	35%	65%

Total Pos. 41%—Total Neg. 59%

TABLE 2

TUBERCULINS—WHITE HIGH SCHOOL
1938-1939
Total Tests—496
Ages 14-22

CONTACTS				NO KNOWN CONTACTS	
99				397	
20%				80%	
Pos.	*Neg.*			*Pos.*	*Neg.*
48	51			141	256
49%	51%			36%	64%
		Pos.	*Neg.*		
		38%	62%		

In the no-known-contact groups, age increased the percentage of reactors, because they mix in with the general public more and there is greater opportunity for contamination. Disregarding contact, you will note that there was a larger percentage of positives in the younger group. These came, for the most part, from the lower economic sections, whereas the older cases came from a more select group (the high schools). In the entire group 41 per cent were positive, which is much higher than one would expect in a community of less than 35,000.

Table No. 2 shows white high school seniors; you will note again the expected larger percentage of positives in the contact group. However, when the group is considered as a whole, you will note 38 per cent of this fairly large series of 496 persons are positive reactors, which is considerably higher than is reported in other sections of the country and which demonstrates a condition here that is extremely bad, because it is from this group of reactors that you may expect to find the active cases of tuberculosis during the next decade. This, too, can be considered a select group.

TABLE 3

TUBERCULINS—COLORED HIGH SCHOOL
1937
Total Tests—44
15 years to 21 years

CONTACTS				NO KNOWN CONTACTS	
3				41	
7%				93%	
Pos.	*Neg.*			*Pos.*	*Neg.*
3	0			16	25
100%	0%			39%	61%
		Pos.	*Neg.*		
		43%	57%		

Table No. 3 shows a total of forty-four tuberculin tests done on the seniors of the colored high school: their percentage of reactors is higher than the white high school, but the proportion is not much larger when one considers the fact that our colored people have three times as much tuberculosis.

Table No. 4 shows the result of ninety-two (92) tuberculins done in a colored trade school; this survey was advised because of the finding of an active case in the school. Strangely, their percent-

TABLE 4

TUBERCULINS—COLORED DEAF AND BLIND SCHOOL
1939

Total Tests—100 (92 read)
6 years to 24 years

TESTS DONE BECAUSE ONE ACTIVE, OPEN CASE FOUND AND THE NATURE OF SCHOOL MAKES CONTACT PROBABLE.

All Considered Contacts
92 (100%)

Positive	*Negative*
30	62
33%	67%

age of reactors was lower than either the white or colored high schools. This can be explained probably by the fact that most of their students came from country districts where there had been little chance for them to have come in contact with tuberculosis previously; also, their average age was less than that in the high school group.

The tuberculosis death rate in the community is unusually high, due in part to the large proportion of negroes living under poor hygienic and economic conditions. They comprise 44 per cent of the population. The yearly combined death rate here as compared with the rest of the State and the country as a whole is shown in Table No. 5.

TABLE 5

NEWPORT NEWS DEATH RATES PER 100,000 COMPARED WITH VIRGINIA—U.S.A.

	Newport News	Virginia	United States
1934	105.0	79.6	53.3
1935	138.0	74.0	51.7
1936	123.0	78.0	55.0
1937	98.0	72.5	53.6
1938	108.0	73.2	49.0

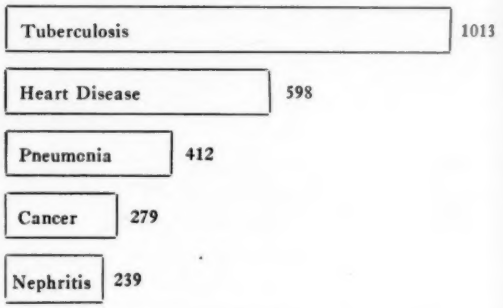
Roughly, our death rate is twice that of the national rate and one-half again greater than that of the State of Virginia.

Table No. 6 presents the death rates in Newport News by races; this shows that the colored have about three times the rate as the whites. The white death rate here is still higher, however, than that of the rest of the country, but it demonstrates definitely why our total rate is so high.

The lower figures show the number of deaths by races and sex. There seems to be no adequate explanation for the sequence. Also, bearing out the observation of others that children under fifteen years of age rarely die of tuberculosis, there were only eight deaths (4 per cent) in this five-year study. It has been stated that childhood (five to fifteen years) is the "island of safety" where pulmonary tuberculosis is concerned.

GRAPH A

DEATHS FROM FIVE MAJOR CAUSES IN VIRGINIA IN 1938
BETWEEN THE AGES OF 15 AND 45



Graph A shows the number of deaths between the ages of fifteen and forty-five from five (5) major causes in Virginia during 1938. You will note that tuberculosis killed more than pneumonia and heart disease combined. This was taken from the *Virginia State Board of Health Bulletin,* 1939.

TABLE 6

NEWPORT NEWS DEATHS FROM TUBERCULOSIS BY RACE AND SEX

Year	Colored Total	Colored Per 100,000	White Total	White Per 100,000
1934	26	156	9	54
1935	34	204	12	72
1936	33	198	8	48
1937	25	150	9	54
1938	27	162	9	54

	1934	*1935*	*1936*	*1937*	*1938*	*Total*
Colored Female	13	21	18	14	23	89
Colored Male	13	13	15	11	4	56
White Male	4	10	4	7	6	31
White Female	5	2	4	2	3	16
TOTAL	35	46	41	34	36	192

Number of Deaths under 15 years—8 (4%)

On a scale map of the city have been located by dots the residences of as many persons as could be found who died of tuberculosis during this five (5) year study. A total of 173 were plotted out of a possible 192. You will note that the dots tend to group together in two (2) areas. It is from these places that most of our cases come, for the adage that "Tuberculosis Breeds Tuberculosis" is certainly brought out in this map. Local slum clearance commissions should be interested in this type of chart, for it is in these areas that their work is paramount.

The treatment of tuberculosis remains essentially the same as promulgated by Trudeau and others more than fifty (50) years ago, namely, rest. There is no chemical pharmacological preparation, serum or vaccine of any proven value in the cure of this disease. Many have been suggested and tried but none stood the test and each in turn was discarded. Recently that seemingly miracle drug, sulfanilamide, has been reported on. Further studies may condemn its use; it is too new for judgment at this time. By far the most promising field is in immunology. You have all seen films of patients who had extensive pathology, but they got well, whereas others with just as much or even less involvement went steadily down hill. It is generally accepted, though, that humans have no true immunity to tuberculosis, for sufficient infection will always cause the disease. But it is also known that some have more resistance to the disease and its progression,[8] and many believe that the secret of this increased resistance is in the allergic field It is known that when anergy, or absence of the allergic reaction, is manifested, the patient has relative resistance or is at the other extreme, practically moribund. Also, it has been noted that a mild or moderate allergic reaction may be present in persons with a high resistance; while those with hyper-allergic reactions show no resistance; in fact, these hyper-allergic persons frequently have the fastest progression shown by large infiltrated areas in the lungs, seemingly out of proportion to infection. The importance of lowering this hyper-allergic state or even to the production of anergy suggests itself as reasonable and practical, but how can this be done?

In the handling of the clinic patients all efforts are made to get the active cases into a sanatorium, for, no matter how persuasively or clearly instructions for his care are given, the tuberculous patient learns more in a few weeks under regimentation in an institution. This education is considered fundamental, for, "once a tuberculous patient always one". If it is impossible to get them away, the visiting nurses carry on this education. Another reason for hospitalization is that, now with modern methods — pneumothorax, phrenicotomies, pneumolysis, and thoracoplasties—this is necessary. Once established, pneumothorax refills are carried out easily when the patient returns home. Another reason for early sanatorium care is the prevention of those people with positive sputa spreading the disease far and wide. After the patient returns from the sanatorium, follow-up work is done by the

association nurses and they are examined at regular intervals in the monthly diagnostic clinics. Pneumothorax refills are carried out at similar weekly clinics. In spite of all this, the death rate has been lowered but little, and this shows that the need, while being met in part, is still a problem with us.

In closing, I would like again to refer to the map, the original this time. On it you will note, besides the 173 circles, 372 triangles; these locate the residence of children with positive tuberculins. You will observe that while the dots tend to coalesce in two main areas, these triangles are scattered without respect to any region. These triangles do not show well on the photograph of the city map, but I can assure you that they are scattered about fairly evenly in contra-distinction to the circles representing deaths. Some of these positive reactors will certainly develop reinfection or clinically active tuberculosis, and they should be followed consistently in order to assure them early diagnosis and a chance to get well.

The purpose of this survey was not only to show that the lower peninsula has a great deal of tuberculosis, but that the problem while in part being met is still of prime importance, for tuberculosis still remains the greatest cause of death in people between the ages of fifteen and forty-five.

NOTE: The author desires to acknowledge the assistance of Dr. G. Colbert Tyler, City Health Officer, in locating the residences of the tuberculous deaths.

BIBLIOGRAPHY

1. Myers, J. A.: The Development of Tuberculosis in Adult Life, *A. I. Med.*, 59: 1-31, 1937.
2. Miller, William Snow: The Lung, Pp. 80 and 149, Charles C. Thomas, Baltimore, 1937.
3. Sweany, H.: Studies on the Pathogenesis of Primary Tuberculosis Infection, *Am. Rev. Tuberc.*, 27: 559, 1933.
4. Fourth Annual Report of the Tuberculosis Committee of the American Student Health Association, *Journal-Lancet*, 55: 350, 1935.
5. Wallgren, A.: Primary Pulmonary Tuberculosis in Childhood, *Am. J. Dis. Child.*, 49: 1105, 1935.
6. Soper, W. B., and Associates: Pulmonary Tuberculosis in Young Adults, *Am. Rev. Tuberc.*, 39: 9, 1939.
7. National Tuberculosis Assoc., Diagnostic Standards, 1938.
8. Miller, J. A.: Some Unsolved Problems of Tuberculosis, *J. A. M. A.*, 111: 111-117, 1938.
9. Myers, J. A.: The Physician and Tuberculosis, *J.A.M.A.*, 113: 189-194, 1939.
10. Product made by Parke Davis Company, Purified Protein Derivative (P.P.D.).

Medical Arts Building.

DISCUSSION

DR. C. LYDON HARRELL, Norfolk: Dr. Hunnicutt has given us a very interesting and valuable paper. His discussion of the literature on the etiology of tuberculosis is fairly complete. The primary infection occurs in childhood, while the secondary or reinfection occurs in adult life. There are two schools of thought on this subject. On the first, or primary infection, all practically agree. As to the second, there is some diversity of opinion. There are many who believe that all tuberculosis in the adult is a direct result of a previously healed tuberculous lesion, or tubercle, breaking down and discharging living tubercle bacilli in the lymph or blood stream, thus causing a reinfection, or endogenous infection.

There are a few who teach that adult tuberculosis is exogenous in origin. They practically disregard the primary or childhood infection, but say it is a new infection as a result of coming in contact with some one that has the disease.

I list myself among the first school of thought, not from any scientific work I have conducted, but from clinical observation. Those who break down with clinical tuberculosis do so as a result of a reinfection within their own body, as a result of the rupture of an old tubercle that has been dormant for years. I am mindful of the fact that exogenous infection can and does occasionally take place. Take, for instance, a young girl in the rural district that has never been in intimate contact with a tuberculous case. Put her in a hospital nursing; she gets an overwhelming infection and breaks down with a clinical case of adult tuberculosis. This is not only an exogenous, but may also be a primary infection. Such cases are rare.

The whole story of the etiology of tuberculosis has yet to be told. Why is it that when young children become infected, many of them die of tuberculous meningitis? Yet a tuberculous fatality between five and fifteen is rare. We used to see a good deal of tuberculous adenitis and tuberculosis of the bones between five and fifteen years of age; with the pasteurization of milk and tuberculin testing of cows these have almost become extinct. At the same time, from this group comes the largest percentage of tuberculin reactors. Why is it in a family of three to four children, reared under similar conditions, one will develop active clinical tuberculosis, while the others remain in good health? This often happens. Why is it that you seldom see both husband and wife break down with clinical tuberculosis? Often they have lived together for months, yes, and years, before the discovery. I cannot recall a dozen instances in my twenty-eight years of experience where both husband and wife developed tuberculosis after they were married, unless they had the disease before. These and many other questions remain to be answered, but we must continue to teach the con-

tagiousness of the disease until the correct answer is found.

I believe that a certain degree of immunity is established by primary infection. As this immunity spends itself, environment and unwholesome living play an active part in developing the disease once the seed has been planted.

Dr. Hunnicutt's studies on tuberculin testing of children are very interesting and informative. My experience with P. P. D., and that is limited to a few cases, indicates it is very sensitive. I still use old tuberculin, giving three doses. I often use the Volmer patch test in small children.

In addition to tuberculin testing, the writer would like to see a survey made of the slum districts of our cities. I feel that in these districts you will find your greatest number of tuberculous cases. I believe that environment and unwholesome living play a vital part in the actual development of tuberculosis.

I prefer the term "no known contact" to "non-contacts." They must get this infection from some source. In slide number 2 his percentage of positive reactors to non-contacts was almost as high as his contacts, 36 per cent against 49 per cent. In slide number 3 he reports 100 per cent positive reactors in known contacts among colored children fifteen to twenty-one years of age. I do not recall reading any previous reports above 80 to 85 per cent.

In April, of this year, Dr. W. L. Harris gave the tuberculin test to 1,019 colored high school children. In the City of Norfolk he used the Volmer patch test. 308, or 30.2 per cent, were found positive. The positive reactors were also X-rayed. Seven cases were found to have active clinical tuberculosis and eighteen were suspicious.

All of this is valuable information. But the greatest good can be obtained by re-examining these children. Many of the non-reactors are going to become positive; some of the positive reactors will become negative. A small percentage will develop active clinical tuberculosis. The most important question for us to determine is the difference between tuberculous infection and tuberculous disease. The only way this can be done is by frequent examination and X-raying the suspicious cases. Tuberculin testing will not diagnose nor determine clinical activity.

EOSINOPHILIA.

A Report of an Atypical Case.

RAMON D. GARCIN, JR., M.D.,*
Richmond, Virginia.

The number of eosinophiles to be found in any normal blood stream varies from 2 per cent to 5 per cent. When as high as 8 per cent or 10 per cent is noted, an explanation should be sought. This increase in the percentage of eosinophiles results in a condition known as eosinophilia which, when present to a marked degree, is suggestive of trichinosis, and anchylostomiasia or amoeba colis. This condition occurs also in varying degrees in bronchial asthma, emphysema, and phthisis with cavities; and diseases of the bones, such as sarcoma and myelogenic leucaemia; in some diseases of the nervous system, such as neurasthenia, hysteria, and certain psychoses; chlorosis; diseases of the skin, such as eczema and pemphigus; and in lithaemic or uric acid diathesis; during convalescence; and in the acute febrile infections, except measles and scarlatina, and many other causes too numerous to mention here, but with which the profession is familiar. The presence of this condition is determined by differential blood count establishing the proportion of eosinophiles to the total leucocyte count. Attempts have been made to create a disease group in relation to which an eosinophilia should be considered as pathognomonic, but this effort of foreign observers has not met successfully the test of clinical experience.

The report which follows varies markedly from any noted in the literature to date, and for this reason it has been deemed advisable to record this case.

P. R., aged thirty-one, by occupation a chauffeur, was admitted to the male medical service of Kings County Hospital on October 14, 1929, complaining of diarrhea and general weakness. Three months prior to his admission the patient had eaten fresh pork late in the evening. He experienced no difficulty that night but about the middle of the following day diarrhea began; his eyes became puffy and by evening his whole face was swollen, the diarrhea persisting. He sent for his family physician who made a diagnosis of "ptomaine poisoning". Within forty-eight hours his face had resumed its normal contour, but the diarrhea persisted (ten to fifteen stools in a twenty-four-hour period) until ad-

*Formerly associate attending physician Kings County Hospital, Brooklyn, N. Y.

XUM

mission. The patient's appetite remained good and he said he felt fine except for general weakness, but during this period he had lost thirty-five pounds in weight.

His past history gave no serious illnesses or operations of any nature. However, four years prior to admission he had had a similar attack of diarrhea, though milder, at which time a diagnosis of tapeworm was made. He was treated for this, and in three days' time claims to have passed the worm. He had no further trouble along this line until admission. He had never had any muscular pains or genito-urinary or gastro-intestinal symptoms. His habits were always regular.

FAMILY HISTORY: He was the third child of four sons and three daughters. His mother and father and all his brothers and sisters were living and well. He was married and had one child, a daughter, who was also living and well.

PHYSICAL EXAMINATION: The patient was a well-developed white male, thirty years of age. He talked with a huskiness of voice; his tongue protruded in a mid-line with a slight fibrillary tremor; his pharnyx was slightly congested with evidence of post-nasal drip. There was no adenopathy noted. His reflexes were present, active, and equal, and the remainder of his physical examination was entirely negative. His admission temperature was 100° F., his pulse 84 and respiration 22.

Due to the patient's run down condition, he was placed on a high caloric general diet while medical observation and laboratory studies were made. His stool was pea-soup in character and they averaged twelve to fifteen in each twenty-four-hour period. The results of the laboratory work were as follows:

1. *Stools*

   Repeated stool examinations failed to show any signs of amoeba, parasites, or ova. No segment of tapeworm was noted. All reports, however, contained the notation that there was present occult blood, mucus, fat droplets, B. coli and many Gram negative bacteria.

2. *Urinalysis*

   Repeated urinalyses failed to show any pathologic findings.

3. *Blood Study*

   A. Chemistry

Sugar	84	mgm per 100 cc.
Urea	25	" " " "
Creatinin	1	" " " "

   B. Wassermann test was negative.

   C. Admission Blood Count

White blood corpuscles	28,100
Red blood corpuscles	4,672,000
Hemoglobin	90% Sahli

   Differential

Polymorphonuclear leukocytes	11%
Small lymphocytes	19%
Eosinophils	70%

4. *Sputum Examination*

   Repeated sputum examinations were negative for tubercle bacilli, elastic fibers, or any evidence of the presence of actinomycosis.

5. *Biopsy* of muscular tissue taken from deltoid and trapezii showed no evidence of trichinosis.

6. *Sigmoidoscopic examination* made by the proctologist was reported as follows: "An eight-inch proctoscope easily passed to sigmoid-rectal junction. The mucous membranes appear normal, and no ulcerations are noted."

7. *Nose and throat examination* was made by the rhino-laryngologist, who reported as follows: "Tonsils are small and chronically inflamed. Left tonsil shows small abscess (?) of the medial superior aspect. Laryngoscopic examination shows a swelling and thickening of the mucous membranes underlying structure in the right anterior epiglottic fold, plus extension into ventricular space at the right side with the same marked thickening of the mucous membranes and underlying structure."

8. *Roentgen Examinations*

   A. "X-ray of the chest shows no evidence of pulmonary or pleural pathology."

   B. G. I. series and barium enema study of the digestive tract were reported together as follows: "No evidence of any abnormality noted throughout the G. I. tract."

Comparative blood studies during the patient's stay in the hospital and at various intervals up to the present time may be noted in the accompanying chart.

One week after admission to the hospital the patient was seized with a marked digestive upset accompanied by nausea and vomiting. The vomitus contained a moderate quantity of free fresh blood. No cause for this could be ascertained. Ten days after admission the patient developed tenderness to touch in the precordial region which extended superiorly to the left shoulder, and posteriorly to the

TABULATION OF BLOOD COUNTS (NOTE EOSINOPHILIA)

DATE	10/15/29	10/20/29	11/1/29	11/15/29	11/25/29	*12/3/29	*12/17/29	*12/31/29	*1/14/30	*1/28/30	*2/11/30	*2/25/30	*3/11/30	*3/25/30
RBC	4,864,000	4,850,000	4,832,000	------	4,800,000	------	------	------	4,812,000	------	------	------	4,820,000	------
WBC	20,900	19,200	18,700	------	19,700	------	------	------	10,200	------	------	------	10,200	------
Hmbg (Sahli)	90	90	90	------	90	------	------	------	90	------	------	------	90	------
Polys.	14	7	10	20	42	20	42	54	56	58	56	56	54	55
Small Lymphs	23	29	26	31	20	20	30	36	38	37	37	38	39	37
Large Lymphs	--	--	--	1	1	1	4	2	3	4	6	4	5	6
Eosinophils	63	63	63	47	36	57	23	8	3	1	1	2	2	1
Transitional	--	1	1	1	1	2	1	--	--	--	--	--	--	1

*These counts taken from Kings County Allergy Clinic. While Pt. being desensitized—first five while hospitalized.

BELOW ARE TABULATIONS OF COUNTS MADE IN PRIVATE LABORATORY

DATE	6/3/30	9/2/30	12/2/30	4/2/31	8/4/31	12/1/31	6/7/32	12/6/32	6/6/33	12/5/33	†6/5/34		†12/4/34		†6/4/35		†12/3/35		*†12/6/38	
RBC	4,800,000	------	------	4,600,000	------	------	4,700,000	------	4,750,000	------	†ac	†1 hpc	†ac	†2 hpc	†ac	†2 hpc	†ac	†1 hpc	†ac	†1½ hpc
WBC	9,200	9,400	8,800	8,900	------	------	8,600	------	8,800	------	--	--	--	--	--	--	--	--	--	--
Hmbg (Sahli)	90	90	------	90	------	------	90	------	90	------	--	--	--	--	--	--	--	--	--	--
Polys	58	57	58	56	49	52	53	59	64	60	62	58	64	54	66	52	63	58	62	60
Small Lymphs	33	38	37	39	40	41	46	34	34	36	36	35	32	33	30	32	36	37	36	34
Large Lymphs	6	4	3	4	8	6	--	5	2	2	1	--	3	4	3	5	1	2	1	2
Eosinophils	2	1	2	1	2	1	1	1	0	1	1	7	1	9	1	10	0	3	1	3
Transitional	1	--	--	--	1	--	--	1	--	1	--	--	--	--	--	1	--	--	--	1

*Counts were made semi-annually—but as they were about same—have not been recorded here.

†Counts were made before and after regular meal containing both pork and beef.

angle of the left scapula. No definite masses were noted, but biopsy made, result previously noted. Three weeks after admission the patient developed acute upper respiratory infection accompanied by productive cough. This was the first time any sputum was obtainable for examination.

Treatment of this patient consisted of high caloric general diet and systematic treatment until the occurrence of the digestive upset noted above. He was then placed on a high caloric liquid diet. After remaining on same for three days, it was noted that his diarrhea had been markedly checked, which was on the tenth day after the intercostal muscular tenderness previously noted. It was thought that in spite of a negative biopsy, trichinosis had not been definitely ruled out, and the patient was put on a course of neo-salvarsan, given intravenously. By this time his diarrhea was almost completely cured and his eosinophilia markedly reduced. However, as his weakness persisted he was again placed on a general diet and within twenty-four hours his diarrhea manifested itself again. The meal taken preceding the re-establishment of this condition consisted of a baked potato, roast beef with gravy, carrots and green peas, milk and custard. This gave rise to the possibility that the patient's condition might possibly be due to an allergic manifestation to some food, and with this in mind he was referred to the allergy clinic for skin tests.

This proved most satisfactory, as the report from these tests showed the patient to be markedly allergic to pork, moderately so to beef, and slightly so to lamb. When these three items were eliminated from his diet, he recovered rapidly and was discharged from the hospital on November 26, 1929. He was immunized to these in Kings County Hospital Allergy Clinic, by subcutaneous insection method of using the specific protein.

His case has been continually watched from that time to the present with no recurrences of previous manifestations. He re-entered the hospital on April 10, 1930, when a tonsillectomy was performed. He was in good physical condition and was discharged the next day. His recovery was uneventful.

He is now completely desensitized to pork, beef, and lamb, and includes these in his diet the same as any normal person, and he experiences no difficulty after eating any of these. The only response to be noted is the variation in his eosinophile count. (See Chart.)

2618 East Broad Street.

Correspondence

Work for Refugee Physicians.

TO THE EDITOR:

The American Neurological Association, in its Executive Session at the Westchester Country Club, Rye, New York, on June 7, 1940, unanimously passed the following resolution and directed its Secretary to send copies of this resolution to the Secretary of each State Board of Medical Examiners and to the editors of the Journal of the A.M.A. and of each State Medical Journal:

WHEREAS official statistics indicate that the immigration of refugee Physicians is numerically small representing in its totality less than .6 per cent of the practicing physicians of this country;

AND WHEREAS such an influx of physicians from abroad cannot adversely affect the economic welfare of American-physicians if the emigres are distributed widely to those sections of the land in which they are needed;

AND WHEREAS information gathered from governmental and private investigations indicates that there are at least 2,000 communities in this land in need of immediate medical staffing which in large part cannot be supplied by the graduates of our own medical schools;

AND WHEREAS many of the demands for physicians come from states in which it has become impossible, either by reason of legal enactments or because of regulations of the State Boards, for the refugee physician to take his medical license examinations;

AND WHEREAS there now exists in New York a competent agency for diverting the unfit among the refugee physicians into non-medical fields thus making it possible only for those who are fit in training and in personality to be considered for examinations;

NOW THEREFORE BE IT RESOLVED that the State Boards of Medical Examiners in the United States shall create a uniform policy with regard to refugee physicians so as to make possible the wide distribution of these physicians to those places where they are needed throughout the land;

AND FURTHER that these uniform changes in the regulations of our State Boards shall be in the direction of the recommendations made by Dr. David L. Edsall in his article on "The Emigre Physician in American Medicine" (Journal of the A.M.A., March 23, 1940, Volume 114, pages 1068-1073);

AND FINALLY that the Committee for Resettlement of Foreign Physicians of the National Refugee Service, Inc., 165 West 46th Street, New York City, shall be utilized as a clearing house for information in regard to available emigre physicians for specific placements.

HENRY ALSOP RILEY, M.D., *Secretary,*
American Neurological Association.

New York, N. Y.,
July 3, 1940.

Public Health Statistics

I. C. RIGGIN, M. D.,
State Health Commissioner of Virginia

The report of the Bureau of Communicable Diseases of the State Department of Health for June, 1940, compared with the same month in 1939 and for the period of January to June, 1940, compared with the same period in 1940, follows:

	JUNE 1940	JUNE 1939	JAN.-JUNE 1940	JAN.-JUNE 1939
Typhoid and Paratyphoid Fever	16	28	68	104
Diarrhea and Dysentery	96	652	447	1,209
Measles	993	1,715	3,121	10,178
Scarlet Fever	112	41	1,013	732
Diphtheria	25	30	288	369
Poliomyelitis	3	1	9	10
Meningitis	8	4	46	37
Undulant Fever	1	2	8	12
Rocky Mountain Spotted Fever	6	12	9	15
Tularaemia	3	3	28	30

TUBERCULOSIS AND PREGNANCY

The percentage of tuberculosis in pregnant women is small compared to the number found in surveys made in industrial and other groups. However, there is no group in which the diagnosis of tuberculosis is so important because of the possible effect on the pregnancy, and the danger of infection in the new born baby.

The detection of latent and active minimal lesions by physical examination is difficult. It is believed that every prenatal case should have an X-ray examination of the chest before the fourth month of pregnancy. The management of these cases is difficult and there should be very close cooperation between the physician and the obstetrician. Pregnancy is no contra-indication for collapse therapy, and many of these patients will go to a safe conclusion with a unilateral or a bilateral pneumothorax or thoracoplasty.

There is much difference of opinion regarding the management of prenatal cases. The following suggestions are made by the State Department of Health as a guide for the care of the tuberculous case:

1. 12th and 16th week of pregnancy:

   Therapeutic abortion is advised for active pulmonary tuberculosis past the moderately advanced stage unless the patient can have intensive sanatorium treatment with all the advantages of skilled care, or the equivalent care at home by a physician skilled in the treatment of tuberculosis and collapse therapy.

2. 16th to 28th week of pregnancy:

   Artificial interruption should rarely be undertaken except in active cases in which the patient is rapidly growing worse.

3. 28th to 40th week of pregnancy:

   Nothing can be done to improve the situation. Watchful waiting policy must be followed regardless of increasing severity of tuberculous infection. Intervention is almost sure to result in a rapid fatal termination.

4. At or near full term:

   Make labor as easy as possible.

   Avoid long fatiguing labor.

   Morphine for sedation.

   Rupture of membranes may be indicated as soon as cervix is sufficiently dilated.

   Episiotomy and low forceps may reduce strain on patient.

   Avoid ether. Gax-oxygen or local anesthesia may be of value.

Many investigators report excellent results in the institution of pneumothorax immediately before or after delivery in the far advanced case. The decreased abdominal pressure following delivery produces a lowering of the diaphragm and a consequent reexpansion of the lungs. This can be prevented by a partial collapse on the affected side.

Truth About Medicine

In addition to the articles previously enumerated the following have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association:

Lederle Laboratories, Inc.

Staphylococcus Antitoxin "Globulin-Lederle-Modified."

Winthrop Chemical Co., Inc.

Diodrast Sterile Solution (35 per cent, weight/volume) 30 cc.

Atabrine Dihydrochloride.

Tablets Atabrine Dihydrochloride (Sugar Coated), 0.1 Gm. (1½ grains).

Tablets Atabrine Dihydrochloride 0.1 Gm. (1½ grains).

Tablets Atabrine Dihydrochloride 0.05 Gm. (¾ grain).

Ampules Atabrine Dihydrochloride Powder 0.2 Gm. with Ampules, 10 cc. size, Sterile Distilled Water.

John Wyeth & Brother, Inc.

Silver Picrate Jelly 0.5 per cent—Wyeth.

Soluble Trituration Silver Picrate 20 per cent with Boric Acid 80 per cent.

Sulfapyridine—Wyeth.

Tablets Sulfapyridine—Wyeth, 0.5 Gm (7.7 grains).

New and Nonofficial Remedies

The following products have been accepted by the Council on Pharmacy and Chemistry of the American Medical Association for inclusion in New and Nonofficial Remedies:

Chorionic Gonadotropin (Follutein).—The water-soluble gonadotropic substance obtained from the urine of pregnant women. This preparation is standardized in international units. One international unit equals 0.1 milligram of a standardized powder (see Council Report, *J.A.M.A.*, 113:2418, December 30, 1939). Its use is recommended in the treatment of cryptorchidism where there are no anatomic lesions causing obstruction of the testicular descent. The diagnosis of an anatomic lesion can often be made in this manner where this therapy fails; thus the surgical treatment of cryptorchidism may be instituted at an early age. Injections should not be prolonged after six to eight weeks if no descent is obtained, since excessive therapy may result in undesirable responses of precocious puberty and possibly other harmful reactions. The diagnosis of cryptorchidism should not include those cases which have been termed pseudo-cryptorchids, in which the testes are maintained in the inguinal canal as the result of reflex muscular spasm. Chorionic gonadotropin therapy in other disorders is still considered experimental because of the lack of sufficient published data.

Follutein—Squibb.—A nonproprietary brand of chorionic gonadotropin (follutein)—N.N.R. Both follutein and chorionic gonadotropin are nonproprietary terms. The product is supplied in the following dosage forms: Vials Follutein—Squibb, 500 International Units, Vials Folluetin—Squibb, 1,000 International Units and Vials Follutein—Squibb, 5,000 International Units. E. R. Squibb & Sons, New York, N. Y. (*J.A.M.A.*, June 8, 1940, p. 2307.)

Benzedrine Sulfate Ampules, 10 mg., 1 cc.—Each cubic centimeter contains 10 mg. of benzedrine sulfate (New and Nonofficial Remedies, 1940, p. 233) in sterile water made isotonic with sodium chloride. Smith, Kline & French Laboratories, Philadelphia, Pa.

Ephedrine Alkaloid—Squibb.—A brand of ephedrine—U.S.P. (New and Nonofficial Remedies, 1940, p. 235). It is supplied in the following dosage forms: Ephedrine Compound Inhalant—Squibb, solution of ephedrine alkaloid containing ephedrine alkaloid—Squibb 1.0 Gm., camphor 0.6 Gm., menthol 0.6 Gm. and oil of thyme 0.3 cc. dissolved in light mineral oil base to make 100 Gm.; Ephedrine Inhalant Plain—Squibb, 1 per cent solution of ephedrine alkaloid in a lilac scented mineral oil base. E. R. Squibb & Sons, New York, N. Y.

Ephedrine Sulfate—Squibb.—A brand of ephedrine sulfate—U.S.P. (New and Nonofficial Remedies, 1940, p. 240). It is marketed in the form of capsule ⅜ grain and ¾ grain. E. R. Squibb & Sons, New York, N. Y.

Ampoules Sterile Solution Caffeine with Sodium Benzoate, 0.5 Gm. (7½ grains) 2 cc.—Each 2 cc. contains caffeine with sodium benzoate—U.S.P. (New and Nonofficial Remedies, 1940, p. 168) 0.5 Gm. (7½ grains) in distilled water. The Upjohn Co., Kalamazoo, Mich.

Hypodermic Tablets Caffeine with Sodium Benzoate, 0.065 Gm. (1 grain).—Each tablet contains caffeine with sodium benzoate—U.S.P. (New and Nonofficial Remedies, 1940, p. 168) 0.065 Gm. (1 grain). The Upjohn Co., Kalamazoo, Mich.

Amniotin in Oil, 5,000 International Units.—Each cubic centimeter contains 5,000 international units of estrogenic substance (New and Nonofficial Remedies, 1940, p. 764). E. R. Squibb & Sons, New York, N. Y.

Propaganda for Reform

Comparative Value of Serum Therapy and Chemotherapy in Pneumococcic Pneumonia.—A detailed discussion of the value of the various types of pneumococcus serums in comparison with the value of sulfapyridine in the treatment of pneumococcic pneumonia. The clinical evidence furnished thus far establishes the efficacy of both serotherapy and the new chemotherapy in lowering the death rate from pneumococcic pneumonia. The relative value of the two methods and the indications for their employment, as well as for the combined use of the two, await further clinical studies. (*J. A. M. A.*, February 24, 1940, p. 662.)

The Effect of Quick Freezing on the Nutritive Values of Foods.—At the request of the Council on Foods of the American Medical Association, Dr. Mary Swartz Rose has prepared a review of available evidence on the nutritive value of quick-frozen foods. Dr. Rose reports that quick freezing is a mode of food preservation which affords the consumer fresh material, free from inedible waste and held in cold storage until delivery. The number of micro-organisms in foods is greatly reduced by quick freezing. Extensive studies indicate that there is little danger from foods frozen and held in storage at temperatures below 32 F., but refreezing of products once defrosted is not a safe practice. Vitamin A values in foods are conserved by quick freezing. Vitamin B_1 (thiamin) is not affected by the freezing but considerable loss may occur in the processes of preparing food for quick freezing such as blanching of vegetables. To conserve vitamin B_1, the blanching time should be as short as is compatible with a product satisfactory in other respects. Little if any loss of vitamin G (riboflavin) has been observed in the quick-frozen vegetables investigated. Vitamin C (ascorbic acid) in fruits appears to be conserved by quick freezing and storage at low temperatures. Loss of vitamin C in vegetables depends partly on the completeness of the destruction of the ascorbic acid oxidase in the blanching process and partly on the conditions under which the vegetable is allowed to thaw. Loss in thawing can be avoided by cooking without defrosting. Partly on the basis of Dr. Rose's report the Council has

XUM

voted to give consideration to quick-frozen vegetables and fruits with a view to inclusion in the list of accepted foods. (*J.A.M.A.*, April 6, 1940, p. 1,356.)

Contraindications to Estrogen Therapy.—Malignant growths of the mammary gland and the uterus have been induced in rodents with estrogens by numerous investigators. Some physicians, however, have doubted that the therapeutic administration of estrogens in the human being could result in the development of similar malignant growths. It has been pointed out that, theoretically, tremendous dosages of estrogens might be required to induce human cancer, when calculated according to body weight. No doubt estrogens have been used intensively for relatively too short a time to warrant the conclusion that mere absence of reports from the literature justified a disregard for the possible consequences of estrogenic therapy. Recently two significant reports have appeared which should indicate the possible dangers of administration of estrogens; one reports a case of mammary cancer following prolonged use of estrogens, and the other reports the appearance of carcinoma of the cervix in three patients among forty-three who were treated with estrogens for kraurosis vulvae and senile vaginitis. The Council on Pharmacy and Chemistry and *The Journal* have repeatedly warned against the indiscriminate and prolonged use of estrongens and have emphasized the possible occurrence of mammary carcinoma in patients who are susceptible to the development of such malignant growths. It would be unwise to consider that there is safety in using small doses of estrogens, since it is quite possible that the same harm may be obtained through the use of small doses of estrogen if they are maintained over a long period. While there appears little or no evidence to indicate that normal women may develop such malignant growths, it would be well for the physician to realize that this is by no means an impossibility in patients who have a personal or familial history of genital or mammary cancer. It has been reported that the new synthetic estrogen diethylstilbestrol is far more active than the natural estrone and estradiol in the production of uterine and extra-uterine fibroids in guinea pigs. There is no evidence, however, that it is more carcinogenic than these substances. (*J.A.M.A.*, April 20, 1940, p. 1,560.)

Heparin.—As a result of the rapidly developing information concerning this substance during recent years, heparin, from being a rather unique anticoagulant with limited laboratory application, has become a promising clinical adjunct. With a highly purified product now available, organic chemists have made progress in establishing the chemical structure of the heparin molecule. The isolation of relatively pure heparin has led to an extensive examination of the relationship of this anticoagulant to the problem of thrombosis, particularly, by Best and his collaborators at Toronto. It was demonstrated that heparin greatly inhibits the formation of thrombi produced in animals by mechanical or chemical trauma to the intima of large exposed veins. The ability to produce coronary thrombosis in dogs by means of sodium ricinoleate was also greatly diminished in heparinized animals, as compared to control dogs which did not receive heparin. These successful experiments have stimulated the use of pure heparin in clinical cases of thrombosis and remarkable results have been reported at the Toronto General Hospital and in Stockholm. Heparin has been employed postoperatively with a high degree of success. Although it is somewhat difficult to evaluate post-operative treatment for the prevention of thrombosis, more direct evidence of the value of heparin may be obtained in the treatment of an existent thrombus. Striking claims have been made in the Swedish clinics for the value of heparin in the treatment of thrombosis in the main trunk of the central vein of the retina, and subsequent definite return of visual acuity has been reported. Similar efficacious results with heparin are reported in vascular surgery. Future clinical work may definitely establish the value of heparin in clinical thrombosis, coronary thrombosis, thrombosis of the large veins and thrombophlebitis. (*J. A. M. A.*, May 25, 1940, p. 2118.)

Book Announcements

The Newer Nutrition in Pediatric Practice. By I. NEWTON KUGELMASS, B.S., M.A., M.D., Ph.D., Sc.D., Attending Pediatrician, Broad Street Hospital and Heckscher Institute, New York; Consulting Pediatrician, Lynn Memorial Hospital, Monmouth Memorial Hospital and Muhlenberg Hospital, New Jersey; etc. Philadelphia. J. B. Lippincott Company. 1940. Octavo of xi-1,155 pages. 183 Illustrations. Cloth. Price, $10.00.

The title of this new volume on nutrition is an exact statement of what is found in its contents. The author has clearly and systematically presented the subject in such a way as to make it meet the everyday needs of the pediatric practitioner.

The volume is divided into three sections. Section one presents Nutritional Physiology. There is an explanation of nutritional growth from the standpoint of body metabolism in every detail. This leads logically to a discussion of the organic nutrients—protein, carbohydrates, fats and vitamins—and then come the twelve minerals so necessary for the formation of new tissues in the maintenance of active metabolism during growth. Finally, acid-base metabolism, which must be constantly borne in mind when treating infants, is discussed. Each of these elements is reviewed from the standpoint of its source, the amount needed by the body, and symptoms of excess or deficiency which might be found.

Section two deals with Nutrition In Health. Food requirements, necessary formulas and feeding behavior problems are taken up with regard to the newborn, the infants, and the older child. In doing this

the author has admirably worked out standards of measurement, nutritional indices and assessments which will serve as aids in detecting abnormalities or deficiencies.

Section three takes up Nutrition In Disease. These are in order, Digestive, Deficiency, Metabolic, Allergic, Infectious and Regional diseases. And these discussions are not technical treatises from a research laboratory, but clear practical discussions followed by page after page of excellent diets to serve as guides in each condition.

As Dr. Kugelmass states, "The caliber of the child's growth and development is determined by the adequacy of his nutrition under normal and pathologic condition." The purpose of this book seems to be to give a clear knowledge of the nutritional needs of the normal child, and to furnish means by which it is possible for one to recognize the sub-clinical as well as the obvious evidences of excess or deficiency of these body requirements. Such information is invaluable to every Pediatrician.

LETA J. WHITE, M.D.

Textbook of Nervous Diseases. By ROBERT BING, Professor of Neurology, University of Basel, Switzerland. Translated and Enlarged by WEBB HAYMAKER, Assistant Clinical Professor of Neurology and Lecturer in Neuro-Anatomy, University of California. From the Fifth German Edition. St. Louis. The C. V. Mosby Company. 1939. Octavo of 838 pages. With 207 Illustrations Including Nine in Color. Cloth. Price, $10.00.

Neurology as a specialty has, in this country at least, been so taken over by the neurosurgeon, the pediatrician, the orthopedist, and the internist that most neurologists in self-defense have evolved into neuropsychiatrists. As far as the former neurologists are concerned, this may be just as well, but as for the patient who happens to suffer with a neurological condition, he is unfortunate indeed should he, as a majority of them undoubtedly do, fall into the hands of someone not especially trained in neurology. It is, therefore, good that adequate neurological textbooks may still be published. There yet remains, however, the question as to whether many physicians trained in some other specialty or many modern medical undergraduates will read and adequately study such a valuable and profound work as that of Bing and Haymaker. Let us hope that at least they will turn to this book for reference. If they consult it they will be repaid by its thorough description, its apt illustrations, and its sensible arrangement of disease and syndrome.

For a quarter of a century or more—since the monumental work of Sir William Gower—there has been a dearth of good textbooks of neurology, and the work under discussion is certainly one of the most satisfactory, if not the best textbook, which has appeared. With the experience of having taught neurology as professor for twenty-six years, I have learned that a satisfactory textbook on the subject must fulfill two requirements: first, it must be so arranged, expressed, and inclusive that it should aid the professor in his lectures to the extent of enabling him to give them with order, clearness, and force; second, it must impart to the student not only knowledge but it should stimulate his interest and inspire his effort. Bing and Haymaker's textbook meets these two requirements to a laudable extent.

The authors of this textbook have not confined their description of nervous diseases to their own experiences; far from it—they have searched the literature of the world and brought their deductions down to concrete, up-to-date, usable form. A teacher of undergraduate or graduate neurology can make no mistake in recommending Bing and Haymaker's textbook to his students or in obtaining it for himself.

BEVERLEY R. TUCKER, M.D.

Essentials of the Diagnostic Examination. By JOHN B. YOUMANS, B. A., M. S., M. D., Associate Professor of Medicine and Director of Postgraduate Instruction, Vanderbilt University Medical School. New York. The Commonwealth Fund. 1940. 417 pages. Cloth.

The scope of this book is exactly what its title implies. While it is in no sense a textbook, as stated in its preface, yet it is unique in its approach to physical diagnosis from the general practitioners viewpoint.

The three fundamental approaches to physical diagnosis, i.e. history taking, physical examination, and laboratory tests, are well integrated into a small pocket edition.

Although the subjects of history taking and physical examination are well covered and often summarized in chart form, the main value of this book to the general practitioner probably lies in the fact that certain laboratory procedures, often necessary to a complete examination, are described. The tests in general are simple, reliable, and accurate. In many cases they might be incorporated into the general practitioners examination where the services of a technician are not readily available.

EDW. E. HADDOCK, M.D.

XUM

Virginia Medical Monthly

Founded by LANDON B. EDWARDS, M. D., April, 1874
Owned by MEDICAL SOCIETY OF VIRGINIA since November, 1919
WYNDHAM B. BLANTON, M. D., *Editor*
AGNES V. EDWARDS, Richmond, *Business Manager*

PUBLICATION COMMITTEE
WYNDHAM B. BLANTON, M. D., Richmond, *Chairman*
J. EDWIN WOOD, JR., M. D., University H. S. DANIEL, M. D., Louisa.

All correspondence regarding editorial matters, articles, advertisements, subscription rates, etc., should be addressed to the Monthly, 1200 East Clay Street, Richmond, Va.
This journal is not responsible for the opinions and statements of its contributors.
All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the American Medical Association.
Subscription Price: $2.00 per annum in advance. Single Copies 25c.

VOL. 67. AUGUST, 1940. No. 8.

Editorial

War and Medicine.

It has long been known that the success of an army involves more than the efficiency of its Ordnance Department. Years ago it was maintained that an army moves on its stomach. That was a tribute to the Quartermaster Department. General Forrest is said to have remarked that success in war depended upon "Getting there fustest with the mostest men." That was a tribute to the Engineering and Quartermaster Departments. Perhaps in the final analysis, even more importance should be attached to the service of the Medical Department.

The duties of the military surgeon include more than the care of the wounded and their transportation to a position of safety. The treatment of the sick of an army is an even more necessary though less dramatic function. But of greater value than either are those prophylactic and sanitary measures which have to be thought out and executed before, as well as while, the army is in the field.

That the success of an army depends on the health of the soldiers is an old story. It was pestilence and not the sword that annihilated the conquering host of Sennacherib when it came down like a wolf on the fold. It was disease as much as the arrows of Montezuma that harassed Cortez and his Conquistadores. It was sickness and the breakdown of the Medical Department that harried and decimated our forefathers in the Revolutionary War. And so it has always been. In our own Civil War the ratio of death from disease to death from wounds was 3.4-1, in the Spanish American War 7-1, and in the World War 2-1.

In modern war with these facts before them and with a marvellously expanded body of scientific knowledge at their disposal, military surgeons have done a better job. Mussolini sent his legions into Ethiopia only after the most careful preparation on the part of his medical department. It is stated that never before have so many troops conducted a campaign in a country where communicable diseases were prevalent and fatal, with so little infection of their own forces. In recognition of this accomplishment the physician responsible for these successful prophylactic measures was honored as an aftermath of the war with the highest military rank that could be conferred upon a soldier.

The present European War has now been in progress almost a year. One wonders, in spite of the fact that little is heard on the subject, how large a part medical departments are playing and what new problems have been met and conquered.

It is important to recall, in order to keep the record straight, and to mitigate as best we may our horror at another holocaust, that tremendous contributions to medical knowledge have issued from war, and that the experience gained by medical men in contact with wounds and disease on a huge scale has

been turned to good effect, not only in a better organization of the medical and sanitary corps of armies but in a better approach to problems of vast importance in civilian medicine as well.

The World War, while it put a quietus on a certain sort of medical research then in progress, on the whole did more for the advancement of medical knowledge than any other one single factor within the last generation. The war was of tremendous educational value to doctors. It sent thousands of them to school again, presented them with new problems and challenged the best that was in them and in the medical profession as a whole.

The war presented the opportunity for the mass study of rare and hitherto poorly understood diseases. The Flanders epidemic of infective jaundice was identified with a similar outbreak in Japan and shown to be due to the *Leptospira icteroides*. Paratyphoid fever was recognized more frequently than ever before. Cerebrospinal meningitis became epidemic both in England and in this country, and advances were made particularly in an appreciation of its epidemiology and the significance of early bacteremia. The pandemic of influenza stimulated an enormous amount of investigative work of lasting value. Scurvy in Iraq, typhus in Servia, deficiency diseases in Central Europe, dysentery in the Gallipoli Peninsula, trinitrotoluene poisoning in munitions workers and tetrachlorethane poisoning among aeroplane makers, epidemic encephalitis, trench fever and trench nephritis constituted an array of old diseases in new guises, as well as diseases never before recognized, which served as a constant stimulus to medical acumen.

Nor should we forget the field of mental disease where shell shock, for example, afforded the opportunity of testing the validity of some of the Freudian theories of morbid psychology based on mental conflicts and the repression of painful experiences. It is doubtful if there was a single specialty of medicine which did not derive some benefit from the experiences of the war. Certainly cardiology did. Orthopedics did. Surgery did. In fact, neurosurgery had its birth at this time and many of the best known specialists in this field today acknowledge the war as the impetus that propelled them into their present work.

On all sides it is being asked what new facts of interest to medicine have been developed in the present war. What type of wounds are being encountered? Is shellshock more or less frequent? What has been learned of the new science of the hygiene of aeronautics? Can the human mechanism stand the terrific speed of the most modern planes; the violent changes of atmospheric pressure that result when it is hurtled through space, now up, now down, and the intense nervous strain of acute fear and chronic anxiety?

In the bureaus of statistics, convalescent camps and hospitals for the care of the permanently disabled which will follow in the wake of this war, the answer will be found by some future student of the subject.

Young Doctors Wanted by the Army.

Several years ago we published in these columns excerpts from an article in the *Military Surgeon by* Captain Harry Armstrong in which the author accurately predicted the type of warfare now going on in Europe, warned against medical unpreparedness in our own country and outlined the ramifications of adequate medical military preparation here. He showed how a proper preparedness plan would integrate the Public Health Service, the State Health Departments, the medical schools, the medical societies and the individual doctor in a comprehensive scheme of coordinated effort. He estimated that it would require 47,000 doctors on active military service to meet the demands of two armies in the field. That is one-third of the entire medical profession in this country.

The present emergency is being met by the Surgeon General's office with appeals sent to medical societies as well as to doctors at large for physicians to join the Medical Reserve Corps of the Army. There is, apparently, no lack of doctors who would be interested in joining as majors and colonels, but applicants for the positions of first lieutenant are seemingly slow in presenting themselves. There are also movements on foot here and there designed to safeguard the interest of those doctors who enlist in the military service by protecting them against the loss of their patients while they are on active duty and by compensating them for financial loss during their absence. When one looks at the scale of pay the army is now, for example, offering to its lieutenants and captains in the Medical Corps, one is inclined to think that the majority of doctors who enter the military service will be better paid than they were before they left home. It is said that to equip an

army in this country costs twenty times as much as to equip an army in Europe, and one can well understand that when one knows the schedule of pay now obtaining in all arms of the United States military service.

We are inclined to believe that a compulsory selective military training is the only fair and satisfactory solution of our military problem. Under its provisions the medical profession would naturally fall. Who should go and who should remain at home and under what conditions, would be more equitably decided under this plan than under any other and there would be less likelihood of unfairness to those who through patriotism are moved voluntarily to sacrifice economic security for God and country.

The New Premarital Examination Law.

By this time all physicians in the State of Virginia are aware of the fact that on August 1, 1940, Virginia's new premarital examination law becomes effective. The State Department of Health has prepared a brochure which it is sending to the physicians of the State. It contains all the necessary information concerning the operation of the law and the obligation of the medical profession under it. In brief the statute provides that both parties contemplating marriage must submit to serological examinations for syphilis, that any standard serological test is acceptable, and that any licensed physician may initiate the examination, but that only laboratories approved by the State Department of Health may perform the tests. It provides further that the application for a marriage license must be made within thirty days of the time when the blood is taken for examination. The law does not exclude syphilitics from marriage. It does make it mandatory, however, for physicians to inform both parties of the results of their examinations, and it requires in the case of a positive blood that the physician repeat the test and extend his examination to a complete physical survey of the case.

The necessary reporting of the examinations has been simplified as much as possible. All that is required is that the physician make out two cards, one of which he must mail to the State Health Department, and the other he must give to the patient.

Proceedings of Societies

Alexandria Medical Society.

Officers of this Society for the present year are: President, Dr. H. A. Latane; vice-president, Dr. James W. Love; and secretary-treasurer, Dr. Samuel H. Williams. All are of Alexnadria.

Botetourt County Medical Society.

At a meeting of this Society on July 15, Dr. E. B. Morgan of Fincastle was elected president for the ensuing year and Dr. L. A. Micou of Eagle Rock was re-elected secretary.

The Dickenson-Buchanan County Medical Society

Held its annual meeting at Grundy, June 19, at which time Dr. J. C. Moore of Keen Mountain was elected president, and Dr. J. C. Trivett of Page was named vice-president. Dr. T. C. Sutherland of Haysi was re-elected secretary-treasurer, and delegates were named to the annual meeting of the State Society.

The Rockingham County Medical Society

Recently reorganized and voted to hold meetings quarterly in February, May, August and November. The new officers elected at that time are: President, Dr. Howard Armstrong of Harrisonburg; vice-president, Dr. Charles Watson of Broadway; and secretary-treasurer, Dr. G. G. Tanner of Grottoes.

Tazewell County Medical Society.

At a called meeting of the Tazewell County Medical Society on July 18, the following officers were elected: President, Dr. J. P. Williams of Richlands; vice-presidents, Drs. Rufus Brittain of Jewell Ridge and W. A. Seawell of Raven; and secretary-treasurer, Dr. Mary Elizabeth Johnston of Tazewell.

XUM

News Notes

Additional Delegates to the State Meeting.

As we go to press, many members are preparing to leave home for the joint meeting of the Medical Society of Virginia with the West Virginia State Medical Association. It is our plan, if possible, to publish minutes of the meeting in the next issue of the MONTHLY.

Names of additional delegates to the meeting, since the list published in the July number are:

Delegate	*County*	*Alternate*
	ELIZABETH CITY	
Dr. Frank A. Kearney		
	NANSEMOND	
Dr. J. M. Habel, Jr.		Dr. O. R. Yates
	ROCKINGHAM	
Dr. C. E. Conrad		Dr. J. C. Harshbarger
	TAZEWELL	
Dr. Mary Elizabeth Johnston		Dr. Rufus Brittain
	WARWICK	
Dr. E. L. Alexander		
Dr. A. A. Creecy		

This leaves only five societies which have not named delegates but it is hoped they may yet be represented.

Symposium on Industrial Health to be Held in Richmond.

The symposium on industrial health at the Medical College of Virginia, Richmond, under the auspices of the department of preventive medicine on September 12 and 13, is being held at a very opportune time. With the stepping up of industrial production due to the rearmament program, it will be necessary that every employee be in the best possible physical condition. Dr. Fishbein in an editorial in the July 6 *Journal of the American Medical Association* says, "The skilled worker becomes of importance equal to that of the man under arms; his indispensability grows as it becomes difficult or impossible to replace him," and, "important is the task of guarding the existing supply of competent and skilled workers against preventable disability." Speaking of the physicians employed by private industry, he says, "They are a body of specialists in industrial practice whose equipment has progressed far beyond the relative immaturity of twenty-five years ago."

It is around these physicians in industry that the symposium program is built. In this group will be the medical director of duPont's, the medical consultant for General Motors, the medical advisor for several large industries in Maryland, an industrial physician in Akron, Ohio, one of the leading authorities on lead poisoning in the United States, and the assistant medical director of the Metropolitan Life Insurance Company. Peripheral vascular and heart diseases will be handled by eminent people in these two fields.

The bureaus of the Federal government will be represented by Dr. Lela E. Booher, chief, Foods and Nutrition Division, Bureau of Economics, Department of Agriculture, and by Mr. J. J. Bloomfield, sanitary engineer of the Public Health Service.

The State Health Department is represented by its Bureau of Industrial Hygiene demonstrating instruments used in surveying plants.

Organized medicine will be represented by Dr. Hugh Trout, president of the Medical Society of Virginia, and Dr. C. M. Peterson, secretary, Council on Industrial Health, American Medical Association.

An industrialist from Philadelphia will appear on the night program to tell what employee health means to industry. On the same program with him will be Dr. Victor G. Heiser, author of "An American Doctor's Odyssey."

A nominal registration fee of $5.00 is charged for this symposium.

Medical College of Virginia News.

Mr. T. D. Rowe, assistant professor of pharmacy, has been granted a year's leave of absence for study this year. Mr. J. M. Early will take Mr. Rowe's place while he is on leave.

Dr. J. A. Reese, assistant professor of pharmacognosy, has resigned to accept the deanship of the school of pharmacy at the University of Kansas. Dr. L. A. Kaufman has been appointed to succeed Dr. Reese.

President W. T. Sanger attended the Institute for Administrative Officers of Higher Institutions at the University of Chicago, July 10 and 11.

The Public Works Administration has made an additional grant of $141,121.00 to the new hospital project for equipment; this brings the total grant for this project to $1,144,800.00.

Dr. John S. Howe has reported for duty as assistant professor of pathology, succeeding Dr. Paul Kimmelstiel who has accepted a position at Charlotte, North Carolina.

Mr. Lynn D. Abbott has been appointed research associate in biochemistry and will report September 1. Mr. Abbott will replace Dr. E. L. Outhouse, resigned.

Dr. Louise Leland Clarke of Chester and Dr. Gordon D. Hall of Dumbarton were named admitting treatment physicians in the out-patient clinic of the College, effective July 1. They will continue to practice in their respective communities when not on duty at the clinic.

News from University of Virginia, Department of Medicine.

A Postgraduate Course on Recent Advances in Internal Medicine sponsored by the Department of Internal Medicine of the University of Virginia and the Department of Clinical and Medical Education of the Medical Society of Virginia was held at the Medical School from June 17 to 22. The list of those giving lectures and holding clinics included the following members of the Faculty of the University of Virginia Medical School: Dr. L. T. Royster, Professor of Pediatrics; Dr. W. E. Bray, Professor of Clinical Pathology; Dr. Alfred Chanutin, Professor of Biochemistry; Dr. James R. Cash, Professor of Pathology; Dr. T. J. Williams, Professor of Obstetrics and Gynecology; Dr. D. C. Smith, Professor of Dermatology and Syphilology; Dr. H. B. Mulholland, Professor of Practice of Medicine; Dr. J. E. Wood, Jr., Professor of Practice of Medicine; Dr. C. B. Morton, Professor of Clinical Surgery and Gynecology; Dr. George M. Lawson, Professor of Preventive Medicine and Bacteriology; Dr. Andrew D. Hart, Professor of Clinical Medicine; Dr. E. M. Landis, Professor of Internal Medicine; Dr. D. C. Wilson, Associate Professor of Psychiatry and Neurology; Dr. W. W. Waddell, Jr., Associate Professor of Pediatrics; Dr. Samuel A. Vest, Jr., Associate Professor of Urology; Dr. Staige D. Blackford, Assistant Professor of Medicine; Dr. Oscar Swineford, Jr., Assistant Professor of Medicine; Dr. E. C. Drash, Assistant Professor of Surgery and Gynecology; Dr. J. M. Meredith, Assistant Professor of Neurological Surgery; Dr. George Cooper, Jr., Assistant Professor of Roentgenology; Dr. Byrd S. Leavell, Instructor in Medicine; and Dr. C. G. Holland, Jr., Instructor in Neurology and Psychiatry. Twenty-one physicians registered for the course.

News from Duke University School of Medicine and Duke Hospital.

On July 1, Dr. Paul G. Reque was appointed Instructor in Dermatology and Syphilology, and Miss Ruth E. Barker as Instructor in Medical Social Service.

On July 15, the new addition to the hospital was opened for full use, with 113 beds for private and semi-private patients, and offices and examining rooms for the Medical and Surgical Private Diagnostic Clinics. The wards in the new addition have been named as follows: Surgical—Cushing; Obstetrical and Gynecological—Williams and Holmes; Surgical Children—Matas; Medical—Minot; and Psychiatric —Meyer.

Dr. W. D. Kendig,

Kenbridge, was recently elected one of the directors of the Bank of Lunenburg.

Dr. Eugene M. Landis,

Of the University of Virginia, was elected secretary of the American Society for Clinical Investigation at its recent annual session.

American Gynecological Society.

Dr. Fred Adair of Chicago presided at the annual meeting of this Society held the middle of June at Seignoiry Club, Montebello, Canada. At this time, Dr. J. C. Litzenberg of Minneapolis was elected president for the coming year, and Dr. Richard W. TeLinde of Baltimore was re-elected secretary. Dr. M. P. Rucker, the only Virginia member, was among those in attendance.

Dr. Riggin Re-Appointed State Health Commissioner.

Governor James H. Price has just re-appointed Dr. I. C. Riggin as State Health Commissioner of Virginia for another term of four years. Dr. Riggin has filled this position most acceptably and the medical profession feels that he merits this appointment.

XUM

Dr. J. Bolling Jones on State Board of Health.

Governor Price also announced the appointment of Dr. J. Bolling Jones of Petersburg as a member of the State Board of Health, succeeding F. W. Darling of Hampton.

Dr. William Durwood Suggs,

Richmond, successfully completed the requirements for certification by the American Board of Obstetrics and Gynecology at the recent meeting of the Board at Atlantic City, June 9.

Married.

Dr. Arthur Morton Smith of Charlottesville and Miss Elizabeth Wood Borst of White Plains, June 22.

Dr. Brown Hutcheson Carpenter of Danville and Miss Mary Harrison Vaughan of South Boston, June 29.

Dr. William Benjamin Hoover, for the past three years resident physician at St. Elizabeth's Hospital, Richmond, and Miss Sallie Frances Perdue of Richmond, June 22.

Dr. Galen Glick Craun, class of '40, Medical College of Virginia, and Miss Beulah Genevieve Spencer of Dayton, June 21. They are now located at Huntington, W. Va., where Dr. Craun is an intern in the Chesapeake and Ohio Hospital.

Dr. James Fendall Parkinson, who has just completed his internship at Grace Hospital, and Miss Sarah Frances Williams of Scottsville, July 3. Dr. Parkinson has located at Chester for practice.

Dr. Julien Herman Meyer, class of '37, Medical College of Virginia, who has since been connected with hospitals in Baltimore, and Miss Dorothy Rose Kahn of Richmond, July 14. They will make their home in Roanoke.

Dr. Harvey Ernest Jordan, Jr., son of Dr. and Mrs. Jordan of the University of Virginia, and Miss Janet Robinson of Hampton, July 13. Dr. Jordan has been serving an internship at the Cincinnati General Hospital during the past year.

Motion Pictures for Medical and Lay Audiences.

The U. S. Public Health Service announces that several motion picture films are available for short time loans, the borrower to pay transportation charges both ways. Those listed are: A New Day (film on pneumonia); Choose to Live (film on cancer); and With These Weapons (film on syphilis). Requests for these should be addressed to the Division of Sanitary Reports and Statistics, U. S. Public Health Service, Washington, D. C. Two films on Syphilis of the Central Nervous System and on Syphilis, Its Nature, Prevention and Treatment may be borrowed from the Division of Venereal Diseases of the same Department, and the film on Three Counties Against Syphilis is on loan for the Public Health Service by the Division of Motion Pictures, Department of Agriculture, Washington, D. C.

Dr. R. T. Hawks,

Carson, has been re-elected a member of the Prince George County School Board for another term of four years, making a continuous service on the Board since September, 1922.

The Neuropsychiatric Society of Virginia

Met in June at St. Albans Sanatorium, Radford, at which time papers were presented by Dr. D. L. Harrell, Jr. of Petersburg on "The First 100 New Admissions to the Petersburg State Colony; Dr. James N. Williams of Richmond on "An Interpretation of Drawings Made by Maladjusted Children; Drs. John C. Palmer and James P. King of Radford on "Experiences with Insulin and Metrazol in the Treatment of 80 Patients"; and by Dr. Frank A. Strickler of Roanoke on "Some Interesting Neurological Cases". Following a business session, the members enjoyed a trip to Claytor Lake and a steak fry on Draper's Mountain.

Dr. L. W. Hulley, Jr.,

Class of '39, Medical College of Virginia, who has been interning at the Medical Center, Jersey City, N. J., announces his change of address to 61 Harvard Avenue, New Brighton, Staten Island, N. Y.

Chief Surgeon to the State Prison System.

Dr. Francis I. Bloise, who has been practicing in Alexandria since 1934 and has been connected with the surgical staff of the Alexandria Hospital, has accepted the position as chief surgeon to the State Prison System in Virginia, on a full time basis. He will have headquarters in Richmond with other physicians serving under him on a part time basis. The full time status of a surgeon for the State Prison System was made possible by the General Assembly of 1940, following a survey which disclosed the need for improvement in health conditions.

The American Board of Ophthalmology

Announces that there will be only one written examination during 1941 and this will be held in various cities throughout the country on March 8.

Candidates enrolled in the Preparatory Group who have been advised that they will be eligible for examination during 1941 should make application AT ONCE to take this written examination. This must be on the regular blanks provided for the purpose and must be received in the Board Office, 6830 Waterman Avenue, St. Louis, Missouri, before December 1, 1940.

A special oral and clinical examination will be held on the Pacific Coast during 1941 providing there will be enough candidates to warrant it. Applications for this examination should be filed before September 1, 1940, so that the Board may complete necessary arrangements.

Dr. Reuben F. Simms

Of Richmond has been named tail twister of the local Lions' Club and also chairman of the committee on health and welfare.

Assistant Surgeons in Navy.

Announcement has been made of the appointment of Dr. Charles F. Hudson of Richmond and Dr. Richard B. Williams of Charlottesville as assistant surgeons in the U. S. Navy, with rank of lieutenant (junior grade). Dr. Hudson is a graduate of the Medical College of Virginia and Dr. Williams of the University of Virginia, both in the classes of 1939.

The American Otological Society Suggests That Deafness and Other Hearing Defects Should be Definitely Defined.

WHEREAS, accurate definition of terms relating to auditory function is important for medico-legal as well as for society and educational purposes the American Otological Society,

NOW THEREFORE RESOLVES that the term "deafness" should be reserved for loss of useful hearing; lessor degrees of auditory loss should be designated as hearing impairment, hearing defectiveness, hearing deficiency or malaudition,

BE IT RESOLVED FURTHER that the American Otological Society hereby requests that the existing Committee of the Council on Physical Therapy of the American Medical Association proceed forthwith to the formulation of standards for the evaluation of deafness and hearing impairment including tinnitus and vertigo in order that such standards may be set up for the guidance of Commissions, Courts, Insurance Examiners and other medico-legal agencies and that copies of these resolutions be sent to the editors of the Journal of the American Medical Association and to each State Medical Journal, and

BE IT RESOLVED FURTHER that the American Otological Society suggests to the Committee on Medical Education and Hospitals and on Physical Therapy of the American Medical Association and to the Associated Medical Colleges, the improvement of instruction to medical graduate students in the fundamentals of the detection, amelioration and prophylaxis of hearing defects and further suggests that information on these subjects be made available to the committee on Graduate Education of the several State Medical Societies.

Dr. William W. Seward,

Surry, a graduate from the Medical College of Virginia, in the class of 1897, who has been in the active practice of medicine for almost forty-three years, recently announced his retirement from the practice of his profession.

The American Congress of Physical Therapy

Will hold its annual scientific and clinical session September 2 to 6, inclusive, at Hotel Statler, Cleveland, Ohio. This year there will be a departure from the usual arrangements in that the mornings will be devoted to an instructional seminar with the scientific program presented afternoons and evenings. The entire instruction schedule is elective in character. Registrants may pursue only the individual courses they desire. The complete course consists of twelve lectures from a diversified list of forty-eight. The scientific program itself consists of papers, demonstrations and motion pictures covering every branch of physical therapy. There will be a separate scientific program covering Eye, Ear, Nose and Throat subjects. Write for schedule, fees, etc., to the American Congress of Physical Therapy, 30 North Michigan Avenue, Chicago, Ill.

Dr. Asa W. Graves, V,

Who interned at the Norfolk General Hospital, following graduation from the University of Virginia in 1939, has located at Lacey Spring, where he has taken over the practice of his father who died recently.

Dr. Edward V. Famiglietti,

Formerly of Grundy but more recently of Front Royal, has moved to Providence, R. I., where he is engaged in the practice of surgery. His offices are at 367 Branch Avenue, that city.

XUM

Dr. R. E. Booker,

Lottsburg, was in July named chairman of vocational service of the Northumberland County Ruritans.

Medical Society of the District of Columbia.

Dr. Daniel L. Borden assumed the presidency of this Society on July 1 and Dr. Henry R. Schreiber became president-elect. Both are of Washington.

Dr. Boyd H. Payne

Was inducted into office as president of the Staunton (Va.) Rotary Club, the latter part of June.

Dr. Berryhill Acting Dean at University of North Carolina.

Dr. William deB. MacNider, who recently resigned as dean of the School of Medicine of the University of North Carolina at Chapel Hill, has been succeeded by Dr. Walter Reece Berryhill as acting dean. Dr. MacNider plans to continue his activities as Kenan research professor of pharmocology.

Dr. Stuart Michaux

Of Richmond, conducted a series of lectures on Gynecology at the annual Graduate Short Course for Doctors of Medicine sponsored by the Florida Medical Association and the Florida State Board of Health from June 24 to June 29 at Jacksonville, Florida.

Dr. Ira C. Evans,

Class of '38, Medical College of Virginia, who has been on the resident staff at Charity Hospital, New Orleans, on July 1 entered upon a service at the University Hospitals of Cleveland, Ohio.

Virginia Doctor Receives Recognition for Exhibit at A.M.A. Meeting.

Dr. E. E. Barksdale of Danville was awarded a Certificate of Merit in Group I of the Scientific Exhibits at the New York meeting of the American Medical Association, for his exhibit illustrating cutaneous manifestation from tobacco with special reference to arsenical exfoliative dermatitis. Group I includes exhibits of individual investigation which are judged on the basis of originality and excellence of presentation.

Dr. Thomas G. Hardy

Of Farmville has been named tail twister in the Lions' Club of that place.

Something For You.

"Osler at Old Blockley" a painting in oil by Dean Cornwell, was unveiled at the dedication of the Osler Memorial Building on the grounds of the Philadelphia General Hospital this past June and was later exhibited at the American Medical Association convention in New York.

The painting depicts one of Osler's outstanding contributions to medicine, namely, bringing medical students to the bedside of the patient for clinical study. In the painting Osler is shown at the side of an elderly patient on the hospital ground. Surrounding Osler and the patient are internes who have stopped with him as they were on their way to the autopsy house to observe one of his famous post mortems. This autopsy house, now the only Osler Memorial Building in the United States, is shown in the background. This memorial was made possible by a grant from John Wyeth & Brother.

"Osler at Old Blockley" is the second painting in the series "Pioneers of American Medicine" sponsored by John Wyeth & Brother as part of a project to highlight the contributions of Americans to the advancement of medicine. "Beaumont and St. Martin" was the first painting in the series.

Colored reproductions of "Osler at Old Blockley", suitable for framing may be obtained free by addressing requests to this JOURNAL, at 1200 East Clay Street, Richmond.

A Study to Evaluate Original Serologic Tests for Syphilis.

More than five years ago the Committee on Evaluation of Serodiagnostic Tests for Syphilis, in cooperation with the United States Public Health Service, conducted a study to evaluate original serologic tests for syphilis or modifications thereof in the United States.

Consideration is now being given by the Committee to the organization of a second evaluation study of original serologic tests for syphilis or modifications thereof within the next year. This will be conducted utilizing methods comparable to those employed in the first study.

Serologists who have an original serologic test for syphilis or an original modification thereof and who desire to participate in the second evaluation study should submit their applications not later than October 1, 1940. The applications must be accompanied by a complete description of the technic of

the author's serologic test or modification. All correspondence should be directed to the Surgeon General, United States Public Health Service, Washington, D. C.

The American Academy of Ophthalmology and Otolaryngology,

An organization of more than 2,500 specialists in diseases of the eye, ear, nose and throat, will hold its forty-fifth annual convention in Cleveland, October 6 to 11, with headquarters at the Hotel Cleveland.

In addition to scientific papers, an elaborate series of courses is presented at each convention to bring the members up to date in their chosen fields. More than 100 of these teaching lectures will be offered this year.

At this meeting, the Academy will honor Dr. Secord H. Large, Cleveland, who this year completes thirty years as comptroller of the organization.

Immediately following the Academy meeting, there will be a Pan-American Congress of Ophthalmology, October 11 and 12, which eye specialists from all the Latin American countries are expected to attend.

Dr. Frank Brawley, Chicago, is president of the Academy and Dr. Frank R. Spencer, Boulder, Colo., is president-elect. Dr. William P. Wherry, 1500 Medical Arts Building, Omaha, is executive secretary.

Dr. G. R. Elliott,

Orange, entered upon his duties as president of the Lions' Club of that place, early in July.

Dr. Carleton Moorman

Was recently named a member of the committee on Community Service of the Rotary Club of Altavista.

Members of Henry County School Board.

Dr. Rowland H. Walker, whose home is just outside of Martinsville, has been named a member of the Henry County School Board from his district.

Dr. D. H. Mason of Ridgeway is also a member of this Board.

Dr. E. D. Davis,

Crozet, was recently installed as second vice-president of the Lions' Club of that place.

Dr. George M. Hutto,

Recently located in Alexandria, is now on active duty with the U. S. Navy Medical Corps at Quantico.

Examinations of American Board of Obstetrics and Gynecology.

The annual written examination and review of case histories (Part I) for Group B candidates will be held in various cities of the United States and Canada on Saturday, January 4, 1941, at 2:00 P. M. Candidates who successfully complete the Part I examinations proceed automatically to the Part II examinations held later in the year.

Applications for admission to Group B, Part I, examinations must be on file in the Secretary's Office not later than October 5, 1940.

For further information and application blanks, address Dr. Paul Titus, Secretary, 1015 Highland Building, Pittsburgh (6), Pennsylvania.

Births.

Dr. and Mrs. James Asa Shield of Richmond are receiving congratulations upon the birth of twin sons on July 20.

For Sale—

McKesson Recording Metabolar. Complete. Practically new. Address "Metabolar", care this JOURNAL, 1200 East Clay Street, Richmond. (*Adv.*)

Doctor Wanted as City Physician.

Excellent opportunity for eligible young doctor who wishes position as city physician in a town in eastern Virginia. Will be permitted to engage in private practice as far as his official duties permit. Inquiries should be addressed to "M.", care VIRGINIA MEDICAL MONTHLY. (*Adv.*)

Obituary Record

Dr. David Nicol Twyman

Died at his home at Appomattox, on June 25, after an illness of several months. He was a native of Madison County and sixty-three years of age. Shortly after graduation from the Medical College of Virginia in 1905, Dr. Twyman located in Appomattox and had been active in practice as well as in civic affairs there, and was master of the local Masonic Lodge in 1918. He was a member of the Medical Society of Virginia, having joined just after graduation in medicine. His wife and three children survive him.

Dr. Norborne Page Cocke

Of Charlottesville died at his home in that place on June 29. He was sixty-two years of age and a

graduate in medicine from the University of Virginia in 1900. After interning at Johns Hopkins Hospital, Baltimore, and at New York hospitals, he located in Birmingham, Ala., where he was connected with the staff of the Hillman Hospital, and did not return to Virginia until 1937. He was in the medical Corps of the Army during the World War. Dr. Cocke joined the Medical Society of Virginia shortly after his return to Virginia and was also connected with various other medical organizations. Several sisters and a brother survive him.

Dr. Francis Randall Hagner,

Prominent genito-urinary surgeon of Washington, D. C., died unexpectedly on July 7, at the age of sixty-seven years. He was a graduate in medicine from George Washington University in 1894, and served on its medical faculty from 1905 to 1939. He had been a member of the Medical Society of Virginia since 1909 and was also connected with a number of other medical organizations. He is survived by his wife.

Dr. Benjamin Robert White,

Since 1899 a practicing physician at Strasburg, died at his home there June 20, after a long period of bad health. He was graduated in medicine from the University of Maryland in 1896 and was a member of the Medical Society of Virginia for a number of years. Dr. White was for thirty-three years a director of the Massanutten bank of Strasburg before being named its president in 1934. In addition to other activities, he was a Mason. His wife died last April.

Dr. Alexander L. Martin, Sr.,

Richmond, died on June 24, at the age of seventy-one years. He studied medicine at the Medical College of Virginia, from which he graduated in 1895, later taking graduate work in surgery. Dr. Martin practiced for a time in Grayson County, before moving to Richmond about thirty-three years ago. His home was in the Highland Park section of the city and he was active in its civic affairs, was a Mason, and held membership in a number of other fraternal organizations. He is survived by his wife, a son, Dr. A. L. Martin, Jr., and two daughters.

Dr. John Leonard Jennings,

Homeopathic physician of Danville, died in that city on July 7, having been in bad health some time. He was sixty-four years of age and studied medicine in Baltimore, graduating in 1900 and had practiced in Danville since that time. Three sons survive him.

Dr. Austin Albert Hayden,

Secretary of the Board of Trustees of the American Medical Association, and prominent oto-laryngologist of Chicago, died July 10, having been ill since returning from the American Medical Association meeting in June.

Resolutions on Dr. Geisinger.

In the passing of Dr. Joseph F. Geisinger on April 15, 1940, the Manchester Medical Society has sustained one of the heaviest losses in the history of the organization. His scientific contributions were always of the highest type and eloquently presented, and his wise counsel could always be depended upon as one of the best guides in shaping the activities of this Society.

Aside from his brilliant mental equipment he was endowed with a rare gift of speech, and a charming personality, all of which were wholly dedicated to service for the betterment of mankind. Besides the many notable contributions that he made in his special field of scientific endeavor, he was untiring in his efforts in the promotion of numerous other activities concerning the welfare of his city, state and nation.

Probably his most monumental achievement outside of his activities in his specialty was his work in the establishment of the hospital service association. A very large measure of the splendid success of this organization was entirely due to his faithful and untiring effort in working out plans for its operation. Fortunately he lived to see the beneficent effects of this fine service realized, but he was not content to rest his oars at the completion of this arduous task; instead, he immediately began work on a plan to provide more adequate medical care for the large group of unfortunate individuals in the low-income class. The voluminous accumulation of data that he collected and assembled in connection with this problem will serve to indicate the large and faithful service that he rendered in this particular field. Words completely fail when an attempt is made to pay proper tribute to a life such as his.

WHEREAS: A wise Providence has seen fit to remove from our midst our beloved, faithful friend and colleague, Dr. Joseph F. Geisinger,

THEREFORE BE IT RESOLVED, that we, the members of the Manchester Medical Society, record his passing with great sorrow, and

In the death of Dr. Geisinger the Medical Profession has lost a most highly esteemed and useful member and the community one of its most outstanding citizens, and

That a copy of this preamble and resolutions be spread upon the minutes of this Society, a copy be sent to the bereaved family, and a copy sent to the VIRGINIA MEDICAL MONTHLY.

L. W. APPERSON,
THOS D. JONES,
Chairman.